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JOURNAL OF EDUCATIONAL RESEARCH

Official Organ of the Educational Research Association

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JOURNAL *of* EDUCATIONAL RESEARCH

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THE COOPERATIVE SURVEY

JOSEPH P. O'HERN
Assistant Superintendent of Schools, Rochester

THIS is the day of science, of research, of exact measurement, of experimental control of processes, of investigation, of reorganization and readjustment of procedures in the light of facts. Just as this new spirit of inquiry is being applied to engineering, to business, and to medicine, it is also coming into play in the field of education so that the whole method of scientific attack is beginning to be applied to the present perplexing problems of education.

This is said by many to be the most important time in the history of education since the Middle Ages. The economic and social changes following the industrial revolution, and more recently the Great War, have resulted in a new world—nationally, internationally, politically, economically, and spiritually. These new tendencies have all had their effect upon the schools, in Europe as well as in America. The Second International Congress for New Education was held at Montreux, Switzerland, in 1923, and was attended by representatives from twenty-four countries. It demonstrated the fact that there is a world-wide unrest in the educational field, and that the trend is away from the selective theory of the past toward a more democratic interpretation of education.

In America, our prosperity and the general desire on the part of all classes for the advantages of education, together with the raising by the states of the age of compulsory school attendance, have led to an almost overwhelming influx of children into the schools. High-school enrollment has increased approximately 1000 percent within the last thirty years. What business concern could face such tremendous expansion without the most careful scrutiny of its organization, methods of production, study of the market, and the efficiency of its service! Problems of the same sort are now absorbing the attention of educators throughout the country.

The increase in numbers of our present school population, caused by the various tendencies of modern life, has been accompanied by a change in the character of the students themselves. The one striking characteristic of these young learners is their almost uniform aimlessness. Formerly, the slow learners, the mentally incompetent, were weeded out by the process of the natural elimination of the unfit. Now, these continue in school alongside the others as a matter of course. They come to high school without definite life plans. Many of them quite frankly come to have a good time at the people's expense. The very last thing they have in mind is scholarship.

In the face of this radically new situation, the question arises, What is the purpose of the secondary school? Is it to present a mild array of simple kindergarten material which even the most mediocre student can be expected to master with a very moderate amount of effort? This would mean a weakening of the entire field of secondary education, so that America could not hope to compete intellectually any longer with the far more strenuous training offered in the best European schools. Is it, on the other hand, the purpose of the secondary school to maintain a high standard of scholarship, with the absolute necessity of excluding large numbers of unqualified or lazy pupils? The dilemma involves the whole question of teaching aims, methods, and results accomplished, with the possible concomitant of revision of curricula, differentiation according to ability groups with accompanying minimum and maximum essentials of material covered and with differing methods applied to each, and finally a complete testing program which is able to accommodate itself to the needs of various groups, but which shall be an accurate measure of the achievement of each individual and afford a basis for applying the remedial work needed.

Such are some of the problems which are facing the teachers, principals, and Board of Education, of Rochester. A year ago a committee was appointed from among the public-school teachers and directors to lead the work of a self-survey of the actual teaching in the schools. Questions of buildings, costs, administrative organization, business management, records, research, and the like, mentioned by Dr. Jesse B. Sears in his book, *The School Survey*, as some of the points which should be included in this scientific task of surveying a school system, are purposely omitted from its program. In 1923, there was published a comprehensive cost report, which openly laid before the public the complete organiza-

tion and work of the school system, with the accompanying financial problems involved. In the same year, there was also published a *Junior High School Report*, which took up the questions of the purpose, costs, organization, and accomplishment of this division of the system. The departments of school-buildings, elementary grades, child study, records and research, special classes, visiting teachers, health education, attendance, and the certification of teachers are constantly making independent surveys of their respective fields, so that it was not thought necessary to stress these phases of the work especially at the present time.

The main emphasis in the present survey is on educational achievement, not only in the secondary-school field, which seems to be the storm-center of attention at the present time, but also junior high- and elementary-school education. Surveys of the elementary and junior high schools have been going on in Rochester, in a more or less informal way, for the past ten years, but now the need has come for crystallizing aims and procedures, and for measuring results cooperatively in all three divisions of the work. Dr. H. C. Morrison has made a great contribution in bringing to our attention the long-known fact that the secondary-school period begins where the mastery of the tool subjects is completed, perhaps in the fourth grade. We are now trying to make application of this fact in the better correlation of work between the upper grades of the elementary school, the three years of junior high school, and the three years of senior high school.

The first definite question, then, which is absorbing the attention of the Survey Committee is the formulation of aims. The need was brought out for a distinction between immediate and ultimate or functional objectives. This distinction also involved the psychological and the sociological or the subjective and the objective aims. At any rate, it was agreed that there are some aims which are clear, definite, and easily measurable, whereas there are others just as desirable but not so capable of accurate measurement, and which are usually deferred and often so involved and tied up with other elements that their presence is forgotten.

For instance, in social science, the senior high division of the committee has formulated and printed its list of aims or objectives psychologically interpreted, which include such diverse ideals as first, *the mechanical elements or skills*, including the intelligent reading of books, magazines, graphs, and statistics; second, *thought elements*, involving reasoning ability, which in turn may be made

up of power of generalization, imagination, and the like; third, *habits, attitudes and appreciations,* including character appreciation, civic mindedness, historical mindedness; and fourth, *ideals and spiritual values,* such as moral leadership, civic efficiency, and pride in mastery. The first of these aims may be more or less definitely measured, but when it comes to a question of the appreciation of moral leadership or of civic efficiency, the history teacher has to rely on means other than tests to find out whether or not her lessons have had the intended effect.

In mathematics, we now have certain definitely formulated printed objectives in algebra, and a set of monographs for the junior high school dealing with both general and specific objectives. In Latin, English, science, and modern languages, also, as well as commercial work, the aims are being discussed, clarified, and put into tabulated form.

In the realm of the elementary school, reading objectives are now clearly represented in the Chart of Attainments in Reading (third revision) of which about fifteen thousands copies have been distributed throughout the country, and in the pamphlet of *Qualitative and Quantitative Standards of Attainment in Reading.* This latter has had one year of trial in half of the schools and is now being used in all schools. In elementary English, the whole course of study is in process of revision; in arithmetic, the aims have been incorporated in the course of study; and in history and geography, the teachers are hard at work defining just what should be taught.

More important, however, than the formulating of objectives is the question of teaching technique or method. The elementary-school division of the survey committee is working to bring suggested methods of procedure before the attention of teachers through meetings with principals, committee work with principals and teachers, institutes for teachers, demonstration lessons by demonstration teachers, classroom visits, and individual conferences. In the junior high, as well as in the elementary school, method has long occupied the attention of teachers, but emphasis is now being put upon the establishment of correlations and interdependencies between the junior high and the elementary school, on the one hand, and the junior and senior high schools, on the other.

In the senior high school particularly, we have seen the need of recognizing scientific principles in education. We have proceeded from the standards of the intuitive group of educators to the stage

of having a psychological or experimental background for our teaching. We are considering the laws of learning as well as the laws of teaching. A whole new code of values has sprung up. As a result of the war and of recent discoveries in all fields, a whole new body of material now exists, which calls for the exercise of judgment in its selection for the modern curriculum.

The committee for the senior high schools has been trying to familiarize teachers with the laws of readiness, exercise, transfer, and the like, by talks before the faculty, by providing an adequate pedagogic library, through committee discussion and the distribution of material prepared by the committee. The central office has made available for teachers a fairly good professional library in each school, including such books as Buckingham's *Research for Teachers,* Morrison's *Practice of Teaching in the Secondary School,* Bagley's *Determinism in Education,* and McCall's *How to Measure in Education.* We are realizing that our students need a much larger assimilative period than we have been giving them. Large numbers of them have not the background for study that our former students had, either in mental virility or in favorable home conditions. We have been trying to content ourselves with 50 percent mastery or less, where we should have complete mastery. The situation demands that we face the matter squarely and, if necessary, revise the teaching methods, the amount of material covered, the curriculums presented, and the opportunities for choice of courses.

Finally, the survey committee has been studying the question of results involving, primarily, the problem of testing. We are confronted with this dilemma: either the excluding of misfits and lazy pupils, as is done in Europe, by uniform written examinations of a highly selective character whose sole aim is scholarship and of such a severe nature that they often extend over a period of several days; or, on the other hand, the abandonment of the attempt to reach the customary prescribed goals in the traditional manner and the cessation of the practice of pushing pupils forward whether they are prepared or not, thus encouraging methods which educators know to be futile and deluding students from year to year into thinking that they have made real progress when the ultimate result is a slammed door at the very end of the road.

Investigations have shown rather conclusively that it is almost impossible to prepare a list of eight or ten questions which shall adequately reflect the aims, functions, values, and objectives of any given subject. Such studies have produced widespread skepticism concerning the reliability of uniform written examinations of the customary type.

The evident weakness of the old-style "essay" type of tests has led to a number of noteworthy experiments. The technique of these "new type" examinations is still in the making. Their common aim is to test functional values as well as mechanical elements, and to offer a more adequate cross-section of the subject tested. But even if adequate, comprehensive examinations were possible—and no one has succeeded in making them so far—experience shows that they too are really set only for the brilliant student. A weak or mediocre student finds it entirely impossible to pass a list of more or less searching questions within the customary time limits. The result is that, in the case of all but the upper level of each class, these examinations tend to become futile, and thus defeat the very purpose for which they are intended. Moreover, it should not be overlooked that the final written examination is rarely, if ever, used as a basis for remedial measures. In most cases the pupil never sees his mistakes. He may be told his final score, but he remains ignorant of his real weaknesses. This fact alone should prevent exclusive emphasis on the customary type of examination.

If uniform written examinations are to be given at all, two steps must obviously be taken at once: (1) Instead of depending on a single test of the usual type at the end of the semester, we must prepare with utmost care a series of special tests, to be given at regular intervals, throughout the year, in each subject. (2) These tests must be so constructed, if possible, as to provide a maximum effort for each level of intelligence.

These special "unit tests" are more likely to give adequate attention to the complete list of objectives, attitudes, and powers which each school subject claims to emphasize. The totality of these tests represents the modern substitute for the single old-type examination. Because of the relatively small scope of each of these unit tests, it is made possible to discover weaknesses on the part of any pupil while there is still time to correct them. The teacher is thus enabled to take remedial measures at an early date. Each examination can accordingly be made much more effective, whereas the customary final examination has but very slight remedial value. If the high school is to continue its present democratic policy of admitting relatively large numbers of pupils of all types, such a testing program seems to afford the only hope in the direction of better scholarship, while at the same time it makes possible the prompt application of the necessary checks and remedial measures. Without such remedial measures resolutely

applied, any testing program is merely an expensive and ineffective luxury.

Definite testing programs are in process of being worked out in the various high-school subjects. They are in no sense something imposed from without, but are being undertaken by committees of teachers within the system. Care is taken to make the teachers feel autonomous in regard to the whole movement. Every effort is made to make available the machinery of diagnostic testing. Last year, the first year of the survey, was a period of exploration and preparation. This year we are carrying on try-out tests in the separate schools; next year we are to inaugurate city-wide use of such tests; and by the following year we hope to have evolved a uniform policy involving objectives, classroom procedure, and the technique of testing.

In mathematics, during the trial period last year, unit tests were tried for the first semester, but were not found entirely satisfactory; for, although the tests had to be given at the same time to all classes of a given grade, the different groups taking the tests were not together in the amount of work they had covered. During the second semester cumulative tests were tried, but these were found to be insufficient. This year we are trying the plan of having the chairmen work out unit tests which are available whenever the groups are ready for them. It is not necessary that the same test be given to all groups, so long as there are tests of the same degree of difficulty. Cumulative tests are also given to all pupils at the end of the term, or at the conclusion of a definite period of work.

It has been pointed out that "medians are a delusion and a snare." More important than the median is what has happened to each individual child. Summary sheets have been prepared with a question analysis for each pupil of the class, for each class, and for all classes in the school. These have proved very helpful as a diagnostic measure, and as a basis for remedial work.

In the junior high school, a series of pretests in mathematics and in ability to study, have been given, the difficulties have been analyzed, and remedial measures based upon the results of the findings have been applied. In the elementary school, an extensive testing program has been put into operation, including standard tests wherever available, local tests prepared through committee work, and many informal tests given by teachers as follow-up procedure. Remedial work in all subjects is based directly on the results of these tests. This is comprised of check tests, type lessons

given by demonstration teachers, frequent drills, and individual and class reviews. As an aid in defining survey plans and suggesting new modes of attack in the actual problems of teaching, the Rochester Board of Education has invited Dr. Morrison, of the University of Chicago, to spend a week in the city for conferences with committee heads, principals, and special groups of teachers.

Already there have been noticeable results of the survey in the changed attitude of the teachers toward the testing movement, a willingness to study, a unified purpose, and cooperative effort among all who have been in any way touched by the work. We are still a long way from solving all the educational problems of the century, but we are earnestly endeavoring to meet these problems squarely, to take inventory of our present resources and our present needs, to make a scientific inquiry into the efficiency of our teaching system, and on the basis of the discovered facts to offer and apply constructive proposals for desirable improvements. Our goal is to "pretest, teach, test again, teach again," until our teaching technique produces results that justify to as great an extent as possible the profound faith of the American people in their system of public schools.

RELATION OF THE SUBJECTS TAKEN IN HIGH SCHOOL TO SUCCESS IN COLLEGE

LAWRENCE BOLENBAUGH
AND
WILLIAM MARTIN PROCTOR
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EASTERN and southern colleges almost invariably insist on academic pattern of preparatory-school subjects for admission. Western and middle western institutions, while more liberal in accepting students from accredited high schools without examination, also tend to insist on the academic subjects as a basis for admission. Thus, the student who has majored in some so-called "vocational subject," and who may be said to have followed a vocational pattern in his high-school work, is practically barred from a college education. The question naturally arises as to whether we are following sound educational principles in insisting on the academic pattern of secondary subjects and thus barring the vocationally inclined student from a chance at a liberal-arts education of college grade. Is it not possible that by following our traditional policy of college admission, we are eliminating many students, who, if given a chance, might attain distinction in college and the professional world? In an effort to throw light upon this phase of college-admission policy, the study herein set forth was made.

Since its foundation, Stanford University has followed a liberal policy in admitting high-school students. It was Dr. Jordan's idea that the high schools should be freed from college domination and permitted to work out their own salvation. He felt that the college should insist upon a high quality of work, but that the courses followed should be left to the high school and the individual high-school pupil. In pursuance of this policy, admission to Stanford was based on fifteen units of high-school work, of a grade of B or better, and the only specific subject requirement is two units of English. In later years, lower-division requirements have been added which compel those who have not had certain high-school courses in modern language, mathematics, and the like to take work in these subjects during their first two years of college. This has had the effect of causing those who were planning to attend Stanford, and who knew about these lower-division requirements, to take the subjects in high school which would reduce such requirements to a minimum. Thus, most of the students applying for admission

have had an academic pattern of secondary preparation. A considerable number, however, who are able to meet the demands of high scholarship during their preparatory course and are able to pass the Thorndike Intelligence Examination for High-School Graduates with a score of 50 or more, take the University at its word and seek admission, even though they have taken a high-school course with a vocational cast.

This study was made in an effort to find out whether those who entered Stanford with an academic pattern of high-school work achieved higher standing in college subjects than those who entered with a vocational pattern. The entering classes of 1921 and 1922 were followed through their entire college courses. All these students were given the Thorndike examination at the time of admission. All foreign students, all those who entered by way of the examination set by the College Entrance Examination Board, all special students, and all those with incomplete high-school records, were eliminated from consideration. There remained 716 students, all of whom had complete high-school records, all of whom had taken the Thorndike test, and all of whom had remained in Stanford at least one quarter.

Each student's high-school record was converted into the point system employed at Stanford, according to the scheme which follows:

Grade	Points Allowed
A, percentage mark of 90–100	3
B, a percentage mark of 80–90	2
C, a percentage mark of 70–79	1
D or below, a percentage mark of less than 70	0

The scholarship rating was obtained by dividing the total number of units or hours into the total number of grade points earned. Thus, an A record would have a scholarship rating of 3.0; a B record, a rating of 2.0; a C record, 1.0; and a D record, 0.0.

The student was classified as one who had an academic or vocational pattern of high-school or preparatory work, on the basis of the number of hours of vocational work he had taken. The student who had less than three units of vocational work, such as commercial subjects, shop and industrial subjects, domestic science, and mechanical drawing was listed as having an academic pattern of high-school work, while the student who had three or more high-school units in those subjects was classified as having a vocational pattern. On this basis, 597 students were placed in the academic group and 119 in the vocational group. The items taken into account were the

student's high-school scholarship rating, the vocational units he took in high school, the percent of his preparatory course that was vocational in character, his score on the Thorndike Intelligence Examination, his college scholarship rating, his age to the nearest birthday at time of admission, the number of quarters he attended Stanford, the circumstances under which he left—whether he was

TABLE I

COMPARATIVE COLLEGE RECORDS OF THE MEMBERS OF THE TWO GROUPS

	Number in Each Group	Graduated (Percent)	In College Record Clear (Percent)	Quit College Record Clear (Percent)	Disqualified, or below 1.0 (Percent)	Died (Percent)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Academic-pattern group	111	43.5	9.9	12.0	33.8	0.8
Vocational-pattern group	494	36.0	10.8	13.6	39.6	0.0
Groups combined	605	41.9	10.7	10.1	36.6	0.7

TABLE II

COMPARATIVE SCHOLARSHIP RATINGS OF MEN IN THE TWO GROUPS

	Number in Each Group	Median High-School Scholarship Rating	Median College Scholarship Rating	Median Intelligence Score
(1)	(2)	(3)	(4)	(5)
Academic-pattern group	111	2.25	1.11	71.5
Vocational-pattern group	494	2.24	1.09	67.6
Groups combined	605	2.25	1.10	71.2*

*Since 1921 and 1922, when the Thorndike Examination was given after admission, to 1926, when it is one of the conditions determining admission, the median score for Freshmen has risen from 71.5 to 80.0.

graduated, was disqualified on account of low scholarship, left college of his own accord ("quit")—or was still in school at the time final compilation was made in August, 1926.

Because in the Stanford student body there are only five hundred women who are selected according to a very strict standard of superior fitness, it seemed fairer to confine the discussion to the cases of men students. Eliminating women students from the

classes of 1921 and 1922, left 111 men who had three or more vocational units and 494 men who had less than three putting them in the academic classification.

The comparative college records of the two groups is shown in Table I. It covers the percent of students, in each group, who were graduated; who were still in college on June 21, 1926, with a clear scholarship record, 1.0 or above; who left college with a clear scholarship record; who were disqualified, on probation, or, if still in college on above date, had a scholarship rating below 1.0; and those who died during their time in college. Table II gives the median high-school scholarship rating, the median college scholarship rating, and the median score attained on the Thorndike Intelligence Examination by each group.

TABLE III

CORRELATIONS BETWEEN SCORES ON THE INTELLIGENCE TEST AND RATINGS OF SCHOLARSHIP IN HIGH SCHOOL AND COLLEGE

	High-School Scholarship and Thorndike Score	College Scholarship and High-School Scholarship	Thorndike and College Scholarship	Thorndike and High-School Scholarship with College Scholarship
(1)	(2)	(3)	(4)	(5)
Academic-pattern group ..	.17 ± .02	.28 ± .02	.45 ± .02	.48 ± .02
Vocational-pattern group .	.35 ± .05	.49 ± .04	.37 ± .05	.54 ± .04

Attention should be called to several items in Table I. Columns *3*, *4*, and *5* cover the students in each group who made good records, that is to say, they either were graduated, are still in college with clear records, or left college with clear records and not because of failure in college work. Combining the percents of these three columns, we find that 65.4 percent of those in the academic group and 60.4 percent of the students in the vocational group made college records of 1.0 or above. In the latter group, 39.6 percent of the cases were disqualified, on probation, or—if still in college—had scholarship ratings below 1.0; in the former group only 33.8 percent of the cases were under such heading. Both in the percent graduating and in the percent doing good college work, the academic-pattern group shows a 5 percent advantage. When it is noted, however, that the academic group has about four points of advantage in median intelligence score, it would seem that, intelligence being equal, the vocational-pattern group had accomplished its college work about as successfully as the academic-pattern group.

The observation just made is further supported by reference to the median high-school and college ratings in scholarship of the two groups shown in Table II. The academic-pattern group is one-hundredth of a point superior in high-school scholarship and two-hundredths of a point superior in college scholarship. There is practically no difference between the two groups in median college and high-school scholarship.

Table III sets forth the correlations between the Thorndike score and high-school scholarship, between college scholarship and high-school scholarship, and between the Thorndike score and college scholarship. It also gives the multiple correlation between the Thorndike score and high-school rating with college scholarship.

When the Thorndike score is correlated with high-school scholarship, the result for those in the vocational group is 18 points higher than for the students in the academic group, although the probable error in the former group is .05 as against .02. This would seem to indicate that in high school the boys who carried from 15 to 50 percent of vocational work in their programs did better work, according to their intelligence, than did the boys whose courses were strictly academic.

In a correlation of high-school scholarship with college scholarship, the vocational group shows a correlation 21 points higher than that found in the case of the academic group, with probable errors of .04 and .02, respectively. The high-school record of the vocational-pattern group of high-school boys is apparently a better index of college success than is the high-school record of the academic group. This may be due to the fact that the students who choose vocational subjects, having selected definite occupational objectives, are more purposeful in their work, or it may be that they tend to select their college work in line with interests and aptitudes already determined by their vocational interests in high school. Whatever the explanation, it is rather disconcerting to have the tradition that an academic pattern of high-school work is a better index of college success than a vocational pattern so rudely shaken. In the correlation between the Thorndike score and college scholarship, the academic group has the advantage, by 8 points, over the vocational group. The fact that for the academic group the Thorndike score is a better index of college success than the high-school record may mean that for this group of boys their high-school work does not call out all their ability, but that college work comes nearer doing so, hence their college achievement correlates more nearly with their intelligence-test score.

Where the high-school record and the Thorndike score are combined in a multiple correlation, the vocational-pattern group of boys again has the advantage by 6 points. That is to say, the predictive value of a vocational pattern of high-school subjects, when taken in conjunction with a Thorndike score, was higher than the predictive value of an academic pattern of high-school subjects, when taken in conjunction with a Thorndike score. Whether this same relationship would hold true for groups of men students at other colleges, or for men and women students taken together, will have to be determined by further studies of this sort. It is sufficiently clear from the foregoing results, however, that the a priori assumptions in regard to the superiority of the academic pattern of subjects for college preparation must needs be subjected to careful investigation and possible revision.

CONCLUSIONS

1. Not enough difference exists between the achievement of the academic-pattern group and the vocational-pattern group of the Stanford men, whose records were included in this investigation, to justify any discrimination against an applicant for college admission because he took from 15 to 50 percent of his preparatory subjects in the vocational group of high-school subjects.

2. There are some indications that the vocational type of student tends to be more consistent in scholarship, since his high-school record correlates more highly with his college record than is the case with the academic-pattern student.

3. There is also some evidence that when the high-school record and intelligence tests are combined in a regression equation, the resulting correlation indicates that the vocational-pattern student is just as good a college risk as the academic-pattern student.

4. College-preparatory courses in high school can permit the election of from three to five vocational subjects without weakening the student's chance of college success.

5. Colleges can well afford to give high schools more freedom in the matter of courses taken by prospective college students. A good high-school record, regardless of the pattern of subjects taken, when combined with a standard intelligence test, such as the Thorndike Examination, is a better basis of selecting candidates for college admission than either the high-school record or the intelligence test alone.

THE INCREASING OF ENGLISH VOCABULARY IN THE ENGLISH CLASS

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AND
EDITH M. PENNEY
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THE Classical Investigation stated as one of the objectives of the teaching of Latin, "increased ability to understand the exact meaning of English words derived directly or indirectly from Latin and increased accuracy in their use." The validity of this objective was supported by the results of experimental studies, which were carried on with the utmost scientific skill, precaution, and accuracy. The teaching-testing study, herein described, proposed to determine the possibilities of building a pupil's English vocabulary in the English class.

The experiment was conducted with a class, having fifteen members, in the ninth grade of the Horace Mann School for Girls. The size of the group was sacrificed to make possible an accurate measurement of the vocabulary of each student and the gain achieved. A control group of fifteen girls took the tests at the beginning and end of the experiment. The members of both groups, with three exceptions, were studying Latin at the time of the experiment, and so whatever increases in vocabulary are found were in addition to the gains due to the Latin instruction. Each member of both groups took eight forms of the Thorndike Test of Word Knowledge,[1] each of which contains 100 words. Only the words, however, from 61-100 were used on Forms G and H, and since 70 additional hard words were given the complete test included 750 words.

This number was ample to give a sufficiently reliable measure of the individual's knowledge of words of each level of difficulty. To supplement the Thorndike Test of Word Knowledge, since it is a measure of recognition only, another test was devised to measure the ability to recall words and use them. One hundred completion sentences were prepared, and an effort was made so to arrange the test that the corresponding word of the Thorndike test was the most appropriate word to use in completing the sentence. Since it is

[1] Forms E, F, G, H are similar to the first four forms but are not sold by the Teachers College Bureau of Publications and hence are not generally known.

almost impossible to construct a sentence such that a certain word is the *only* word—even though there may be one best word—that may stand in a certain position, a key was used, in scoring this test, which listed several alternatives for many of the words. Credit was given if any one of these alternatives was used. For instance, the forty-ninth word in Form A is *appropriate*. The corresponding completion exercise is, "It will be difficult to make a speech ..... to such an important occasion." The words listed in the key are *appropriate, referring, pertaining, suited, adapted.* Any one of

TABLE I

COMPARISON OF THE RECOGNITION AND COMPLETION TESTS AT ALL LEVELS FOR BOTH GROUPS COMBINED

SERIAL ORDER OF ITEMS	RANGE OF WORDS ACCORDING TO THORNDIKE WORD LIST	PERCENT CORRECT		MEAN POSITION IN THORNDIKE WORD LIST OF ACCEPTABLE COMPLETION WORDS	MEAN POSITION IN THORNDIKE WORD LIST OF UNACCEPTABLE COMPLETION WORDS	PERCENT	
		Recognition	Completion			Unacceptable	Unanswered
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1– 4...	1– 1,000	96.5	81.1	663	286	13.2	5.7
5– 12...	1,001– 2,000	94.1	78.5	1,239	2,216	19.1	2.4
13– 20...	2,001– 3,000	93.0	78.5	2,162	3,177	13.0	8.5
21– 28...	3,001– 4,000	89.7	65.3	2,885	2,845	26.2	8.5
29– 36...	4,001– 5,144	86.1	69.3	3,673	3,022	24.3	6.4
37– 44...	5,145– 6,047	84.8	72.4	4,408	2,894	22.9	4.7
45– 52...	6,048– 7,262	75.3	63.2	4,982	3,246	24.8	12.0
53– 60...	7,263– 8,145	69.0	50.0	5,538	3,454	42.4	7.6
61– 68...	8,146– 9,190	73.5	60.1	7,331	2,277	32.1	7.8
69– 76...	9,191–10,000	72.5	39.2	4,925	3,438	47.4	13.4
77– 86...	10,000–15,000	62.0	40.0	5,608	3,905	44.1	15.9
87–100...	15,000–20,000	49.8	48.4	6,371	4,476	32.2	19.4

these words gives the sentence meaning, and consequently is given a credit. At no level of the Thorndike test is the ability to recall words equal to the ability to recognize them. Children can recognize the meaning of a word even though they cannot use the word where it is appropriate.

Several inferences may be drawn from Table I which gives a comparison of the results on both of the vocabulary tests. Since the percents in Column *4* are consistently less than those of Column *3* at all levels within the tests, we may infer that fewer words can be recalled for appropriate use than can be recognized with their meanings. The number of unanswered words in the completion test was small. The pupils attempted to find a word to express the thought

even though it was not the best word or did not adequately convey the meaning intended. The number of omissions grew larger as the gaps in the completion tests required less frequently used words, indicating a progressive failure to recall and use words as the words belong to the higher thousands of the Thorndike list. The acceptable words were often more familiar than the best word. In any instance where a word was to be found and used, the tendency was to make use of the most familiar word that would serve in the

TABLE II

PERCENTAGE RECORDS OF THE TWO GROUPS ON THE FIRST FORM OF THE RECOGNITION TEST

Order of Items	Control Group	Practice Group
(1)	(2)	(3)
1– 4	95.5	97.5
5– 12	93.2	95.0
13– 20	92.5	93.5
21– 28	90.0	89.4
29– 36	86.1	86.0
37– 44	84.0	85.6
45– 52	74.1	76.5
53– 60	68.0	70.0
61– 68	72.8	74.2
69– 76	71.2	74.5
77– 86	58.4	59.0
87–100	50.1	49.4
70 hard words	21.9	19.2
Average 100 words	75.2	76.3
Average 170 words	53.3	52.8

context. Unacceptable words tended to be still more familiar than the acceptable words. If the appropriate word was not recalled, a pupil tended to use a common word that has some relation to the desired word and to the general sense.[2] This tendency on the part

[2] An interesting fact, in this connection, may be gleaned from scanning the distributions. As the completion sentences approach the higher levels of the Thorndike classification the distribution of unacceptable words becomes bimodal. Pupils use either common familiar words or personal, slang words. Were it not for these individual words which are classed as inappropriate, but are outside of the ten thousand most frequently used words of the Thorndike list, the average of unacceptable words would be still lower in the list.

of the pupils, to use unacceptable words increased steadily as the appropriate words lay beyond the range of their vocabularies.

These facts seem to indicate that persons get along with smaller vocabularies than their needs of communication require. They make a familiar word serve where a less frequently used word would convey the exact shade of meaning more accurately. Vocabulary training is not merely the learning of more words, but learning to use words more accurately to convey precise shades of meaning.[3]

The schedule of assignments used during the experiment is listed at the end of this article. Throughout the practice period our purpose was to arouse and maintain the pupils' interest in the study of words.

At the beginning of the experiment, the two groups were approximately equal in their ability to recognize and use the English

TABLE III

SCORES IN THE TEST OF WORD RECOGNITION MADE BY MEMBERS OF THE EXPERIMENTAL AND CONTROL GROUPS EXPRESSED IN PERCENTS

ORDER OF ITEMS	CONTROL GROUP			PRACTICE GROUP		
	First Testing	Second Testing	Difference	Before Practice	After Practice	Difference
(1)	(2)	(3)	(4)	(5)	(6)	(7)
45– 52	74.1	78.6	+4.5	76.5	83.6	+7.1
53– 60	68.0	70.7	+2.7	70.0	73.0	+3.0
61– 68	72.8	75.2	+2.4	74.2	82.3	+8.1
69– 76	71.2	75.8	+4.6	74.5	82.2	+7.7
77– 86	58.4	63.4	+5.0	59.0	66.7	+7.7
87–100	50.1	47.2	−2.9	49.4	56.3	+6.9
70 hard words	21.9	21.6	−0.3	19.2	21.9	+2.7
Average 56 words	63.8	66.0	2.2	65.0	71.9	6.90
Average 126 words	40.5	41.3	0.8	39.6	44.1	4.5

words contained in the two tests. The reader may verify this statement by referring to Columns *2* and *3* of Table II for the Thorndike Test of Word Knowledge and Columns *2* and *5* of Table IV for the completion test. The average score on the recognition test for the control group was 75.2 percent and for the practice group

[3] The correlation between the results of recognition and completion vocabulary was 0.70. The correlation of the completion test given before and after the experiment was 0.68. The reliability of the total recognition-vocabulary measure may be taken as 0.96. This yields a correlation between the recognition and completion vocabulary corrected for attenuation of 0.87.

76.3 percent; on the completion test the corresponding percents were 57.9 and 59.6. The gains made by the members of the experimental and control groups in the Thorndike Test of Word Knowledge are shown in Table III; those on the completion test in Table IV. The practice group gained, on an average, 6.9 words out of every 100 tested, while the control group gained, on an average, 2.2 words out of every 100 tested, that is, the gain of the practice group was three times that of the control group. The reliability of the differences shown in Table III was tested in one instance and was found to be a real difference in the statistical sense, for the standard deviation of the difference was 1.59, while the actual difference was 4.7. These computations show that the testing was extensive enough to make both the gains in the two groups and the difference between the gains significant and real. Although gains

TABLE IV

PERCENT CORRECT AND GAINS MADE BY EACH GROUP ON THE COMPLETION TEST

ORDER OF ITEMS	CONTROL GROUP			PRACTICE GROUP		
	First Testing	Second Testing	Difference	Before Practice	After Practice	Difference
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1- 4	82	84	+ 2	75	81	+ 6
5- 12	79	78	− 1	76	84	+ 8
13- 20	79	83	+ 4	76	79	+ 3
21- 28	71	69	− 2	66	62	− 4
29- 36	60	71	+11	68	81	+13
37- 44	68	72	+ 4	75	76	+ 1
45- 52	69	70	+ 1	69	69	0
53- 60	37	45	+ 8	55	63	+ 8
61- 68	51	56	+ 5	60	73	+13
69- 76	36	35	− 1	44	45	+ 1
77- 86	38	35	− 3	41	45	+ 4
87-100	49	45	− 4	39	59	+20
Average	57.94	59.48	+ 1.54	59.66	66.56	+ 6.90

on separate levels of the tests and the total gain on the completion test cannot be said to have been measured with the same reliability, nevertheless, they are quite in harmony with this gain which has been proved to be significant.

Thorndike in his report of the study he conducted for the Classical Investigation gives a comparison of the gains made by certain Latin and non-Latin students on the Thorndike Test of Word Knowledge. This comparison, expressed as the average gain of the group taken as whole, is summarized in Table V.[4]

The average gains of our groups, tested over an interval of four months, may be compared with these results. Our control group made a gain of 2.2 percent which was slightly above that made by Thorndike's Latin students who had studied for one-half year. This may be accounted for in part by the fact that these girls, of Horace Mann School, were superior students and in part by the fact that the 2.2 percent refers to the last 60 items on the test which,

TABLE V

GAINS MADE BY CERTAIN LATIN AND NON-LATIN STUDENTS REPORTED BY THORNDIKE

	Gains		Superiority of Latins
	Latins	Non-Latins	
(1)	(2)	(3)	(4)
After 2 years.....	5.2	5.8	−.60
After 1 year			
Two-year group ..	3.5	3.4	.10
One-year group...	3.78	3.04	.74
After one-half year			
Two-year group ..	1.8	1.4	.40
One-half-year group.....	1.33	1.39	−.06

being at the more difficult end of the test, gave them a chance for larger gains. In all probability, the gains achieved by the Thorndike Latin groups and our control groups may be considered approximately equal.

Compare with this the gain of 6.9 percent made by our practice group; it is greater than any of the gains made by either of Thorndike's groups in two years. The conclusion is inescapable that if increase in English vocabulary is the goal, time spent in the English class on vocabulary is of much greater aid than time spent in the Latin class. A direct attack on the problem yields by far the more worth-while results.

[4] Thorndike, E. L. "The Gains Made in Ability in English by Pupils Who Study Latin and by Pupils Who Do Not," *School and Society*, 18:690, December 8, 1923.

Haskell and Hamblen, in reporting on the Philadelphia experiment[5] on teaching derivatives in Latin and non-Latin ninth-grade classes, state the gains which are summarized for our purposes in Table VI. The control groups were those taught with no special reference to derivation while the experimental groups were those taught with special reference to derivation. The figures given are the average figures in five schools. The results in the Latin control groups are considerably higher than those reported by Thorndike or by us. The results in both the Latin and non-Latin experimental groups are lower than those found for our practice groups for a shorter time. Although Haskell concludes that greater gain in English vocabulary results from a study of derivation in the Latin class than in the English class, our results would seem to indicate

TABLE VI

GAINS IN LATIN AND NON-LATIN CLASSES IN PHILADELPHIA

	First Semester	Second Semester	Year
(1)	(2)	(3)	(4)
Non-Latin			
Control group.....	3.12		6.04
Experimental group..	6.0		8.5
Latin			
Control group.....	5.15	1.69	6.74
Experimental group..	6.53	3.66	10.67

that a direct attack on vocabulary in the English class may be conducive to better results than with derivative study in either English or Latin classes.

A study of the specific words which were incorrect on the first test, before the experiment, but passed on the test, after the experi-

[5] These figures must be taken at their face value. In both monographs the results are inadequately reported. In no case is the number of cases or reliability reported. Glaring errors in arithmetic are to be found.

Hamblen, A. A. "A Statistical Study to Determine the Amount of Automatic Transfer from a Study of Latin to a Knowledge of English Derivatives, and to Determine the Extent to Which This Amount May Be Increased by Conscious Adaptation of Content and Method to the Allowment of This Objective." Doctor's dissertation on file at the Library, University of Pennsylvania, 1924.

Haskell, R. I. "A Statistical Study of the Comparative Results Produced by Teaching Derivation in the Ninth-Grade Latin Classroom and in the Ninth-Grade English Classroom to Non-Latin Pupils." Doctor's dissertation on file at the Library, University of Pennsylvania, 1924.

ment, does not yield positive results. There were 19 words which five more girls in the control group passed in the second testing than in the first, and 24 such words in the experimental group. An examination of these words shows that only three of the 24 were in the group of words beginning with the letters A to H of the sixth to the eighth thousand words in the Thorndike list. Only one of the 24 has a frequency of more than the sixth thousand. Twenty of the twenty-four words were less frequently used than the words of the eighth thousand. Apparently the method employed yielded results less because of the specific words learned in class, than because of the interest stimulated in words in general which resulted in attention to, and the consequent learning of, new and strange words wherever met.

SUMMARY

1. Fifteen ninth-grade girls were given special vocabulary instruction in the English class over a period of four months. Seven hundred and fifty words taken from the Thorndike Test of Word Knowledge, were used as a test of these pupils' achievement before and after instruction. A group without practice was tested at the same time as the control group. A completion test, constructed in parallel order to Form A of the Thorndike test, was used as a measure of recall vocabulary.

2. At the end of four months of instruction, the score of the practice group had increased 6.9 words per hundred, whereas that of the control group had increased but 2.2 words per hundred. These gains and the differences between them were found to be significant.

3. The gain of the experimental group was greater than the gain made by a group that had studied Latin for two years in an earlier experiment conducted by Thorndike; and also greater than the gain made in a semester by certain Latin classes which received special instruction on derivatives during the Latin period, in a Philadelphia experiment.

4. Certain facts were found in comparing recognition and recall vocabularies. At all levels fewer words were recalled where they could be appropriately used than were recognized with their meaning. There was a tendency for pupils to find a word to express a thought even though it was not the best word. The number of omissions in the completion test became larger as the appropriate word to be recalled became less familiar. Acceptable words in this

test tended to be words which were more familiar, as measured by the Thorndike Word List, than was the best word. Unacceptable words tended to be still more familiar than acceptable words. There was a growing tendency to use unacceptable words as the appropriate word to be recalled becomes less familiar.

SCHEDULE OF ASSIGNMENTS

We planned to spend ten or fifteen minutes a day on words, and after the first few assignments, to ask the pupils to do no work outside of the class. Our purpose was first to arouse the pupils' interest in words; second, to keep them actively at work at increasing their vocabularies, to make them alert to find new words, to insert their ability to discriminate shades of meaning. We did not assign lists of words to be looked up, except in the preliminary study of derivation, for we did not wish the students to find the work tiresome. We simply talked about a few words every day; and the words we chose for discussion were the words from A to H in the sixth to eighth thousand of the most frequently used words, as listed in the Thorndike *Word Book*. We did not go beyond H simply because we did not have the time.

For material in the vocabulary study, the texts used were Leonard and Cox, *General Language;* Century, *Word Book;* Thoma, *Language in the Making;* and Fernald, *Expressive English* together with various texts in English composition.[6]

The girls were encouraged to keep word books in which they would put interesting facts concerning words and new words which they wished to add to their vocabularies, but no attempt was made to secure uniformity on the part of the class in this project.

Assignment I—

1. List the specific reasons why you think a large vocabulary will be a valuable asset to you.
2. What means have you found most successful in adding to your own stock of words?
3. When is a word really a part of a person's vocabulary?

Assignment II—

1. Why do we have a language?
2. How did language probably originate?
3. Which came first, speech or writing?
4. How did people first write?
5. What is the advantage of an alphabet over hieroglyphics?

(Suggested readings were reported in class from the *Just So Stories;* How the "First Letter was Written"; "How the Elephant was Made.")

Assignment III—

1. How did different languages develop?
2. To what family of languages does English belong?
3. What languages make up the English tongue?
4. When did these various elements come into the language?

[6] An excellent discussion of methods of enlarging and enriching the vocabulary may be found in chapter IV of Part I of the *Twenty-fourth Yearbook of the National Society for the Study of Education.*

Assignment IV—

1. Look up in an unabridged dictionary the following words: *boycott, boomerang, algebra, sky, potato, car, voodoo, kimono, telegraph, slogan, sheckel, boudoir, sizzle, tea, piano.*

2. From what sources have words come into the language since the language was established as a national speech?

Assignment V—

Make as large a list of onomatopoeic words as you can without reference to a dictionary (class work).

Assignment VI—

Make a list of all the words you can think of derived from names of animals which are used in other than a literal sense. Example: *mulish, asinine, hen-pecked* (class work).

Assignment VII—

From your reading of *Ivanhoe* and from your knowledge of history, what have you learned concerning the general character of Anglo-Saxon words as compared with that of French words?

Assignment VIII—

Selections from Hope's *Our Anglo-Saxon Tongue* were read in class.

Assignment IX—

Bring in three words illustrating the meaning of the Anglo-Saxon prefixes fore-, out-, mis-, over-, under-, un-, with-.

Assignment X—

Make a list of three words illustrating the meaning of the common Anglo-Saxon suffixes -ful, -fold, -ish, -less, -like, -man, -ship, -ward, -wise, -ness (class work).

Assignment XI—

Make a list of the common Latin prefixes; give two illustrations of each in English words. (Class work—all but three of the girls were studying Latin.)

Assignment XII—

Make a list of the commonest Latin root words. Illustrate (class work).

Assignment XIII—

Look up the meaning of the following Greek roots: auto-, bio-, geo-, -ology, graph-, phon-, tele-, -scope.

Assignment XIV—

General versus specific words. List all the specific verbs you can think of for the general word *move*.

What word would you use to describe the movement of (1) a squirrel on a tree, (2) a robin on a lawn, (3) a frightened pigeon, (4) an automobile on a clear stretch of parkway, (5) a horse at full speed, (6) a lively cat (class work).

Assignment XV—

List specific words for the general word *odor*. Describe the odor of a rose, gingerbread baking, new-mown hay, gasoline, violets, ammonia, onions (class work).

Assignment XVI—

List specific words of sound. Describe (1) the bell of a fire engine, (2) a church bell ringing for a funeral, (3) a fire gong in a school, (4) a door bell, (5) a telephone bell (class work).

Assignment XVII—

List specific words for walk. Picture in words (1) the walk of a prim old lady on a wet day, (2) a child going to school the first day, (3) a tired workman coming home after his day's work, (4) a boy on his way to the

principal's office where he has been sent for disorderly conduct, (5) a brisk business man on his way to a promising interview.

Assignment XVIII—

Write one sentence in which the following words are correctly used: nice, lovely, awful, interesting, beautiful. Write three sentences containing synonyms for each of these words (class words).

Assignment XIX—

Synonyms: Look up the meanings of eager, earnest; ignorant, illiterate, uneducated; courage, fortitude, resolution, endurance; conscious, aware; likely, liable, apt; begin, commence, start.

Assignments XX-XXX—

Discussion of *word pictures* and *figurative* language in "The Rime of the Ancient Mariner," which the class was then studying. Lines were examined to find the most suggestive word or words.

Assignments XXX-XLVIII—

Discussion each day of ten to fifteen words in the Thorndike Word Lists of the sixth to eighth thousand of the most commonly used words beginning with the letters A to H (entirely class work).

Although it was planned to spend ten to fifteen minutes daily on this work, the time allowed soon dwindled to five minutes a day for the bulk of the teaching.

HIGHER-DECADE ADDITION IN SOME RECENT DRILL DEVICES[1]

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A few months ago a superintendent of schools requested the writer to express an opinion on a certain set of arithmetic drills which had appeared recently. He had been importuned by a representative of the publishing company to adopt this particular set of drill materials for use in schools of the city. He was willing to adopt these drills if he could be assured that they were so constructed that they would provide a systematic distribution of practice on the fundamental bonds. The word, "systematic," was not defined, but the meaning inferred was that no important combinations should be unpracticed, that those which are most necessary should be given special emphasis, and that the more difficult a combination the more practice it should receive.

Manifestly, it was impossible to dictate an immediate reply to this request. A thorough analysis, of all the examples provided in the set of exercises, would have required several weeks. The best that could be done, at the time, was to examine one specific phase of these exercises; the addition examples designed for a particular grade were chosen. Since the superintendent had requested a prompt reply to his letter, only the higher-decade combinations whose larger addends were in the fifties were considered. Every example in which such combinations occurred was added, and a record was kept of the frequency of the occurrence of the combinations within this group.

The result was interesting. The numbers, added to each number within the fifties together with the number of times each appeared within the practice series, were:

Larger Addend	Smaller Addend
50.....	.....
51.....	.....
52.....	2 twice, 3 once
53.....	.....
54.....	2 and 4, each once
55.....	3, 4, and 5, each once

[1] Paper read before the Educational Research Department of the Ohio State Teachers Association, December 29, 1926.

Larger Addend	Smaller Addend
56.....	3 once
57.....	1, 5, and 9, each once; 6 twice
58.....	3, 5, 6, and 8, each once
59.....	2, 4, 8, each once; 6 twice; 7 twice

Why a pupil should add to 59 seven times, to 56 but once, and to 53 not at all is not told in the teacher's manual which accompanies the material. Nor are we told why a pupil should add 6 and 7 to 59 twice each and not be permitted to add 1, 3, 5, and 9 to 59 at all. Doubtless, the occurrence of higher-decade combinations in the fifties was left to chance. We possess information about this practice material which the author probably does not have, although in the teacher's manual he admits the importance of proper training in higher-decade addition. Indeed, the decision to study this particular phase of higher-decade addition was suggested by reading the teacher's manual.

Since answering this superintendent's letter, the writer has found time to study the provision which three recent sets of arithmetic drill materials make for higher-decade addition in the twenties. The three sets are here designated by the letters, A, B, and C. In Set A all the examples in column addition designed for the third grade were used, in Set B all such examples prepared for the fourth grade, and in Set C the column-addition examples of a series of test exercises intended for use in each of several grades. All of the examples were added, and a record was kept of the higher-decade combinations whose larger addends were in the twenties.

In no one of these three cases, does the author indicate whether he intends that the pupil shall add upward or downward. We shall not discuss the relative merits of upward and downward addition as the initial learning process, but if we are providing for for practice on the higher-decade additions it makes a difference whether we add upward or downward. Examples arranged to give practice on certain bonds, if the pupil adds upward, will give practice on quite a different set of bonds if the pupil adds downward. Since we could not tell what the intentions of these authors were—if they had intentions—we added the examples both up and down keeping a record of the frequency with which higher-decade combinations in the twenties occurred in each case. In examples containing two or more columns of digits, we assumed that the number carried would be added in at the beginning of the next column.

The results are given in three tables. The upper half of Table I shows the practice in higher-decade addition in the twenties which a pupil gets if he adds Set A downward. The table should be read

as follows: In Set A, 0 was added to 20 one time; 1 was added four times; 2 was added eight times; etc. The lower half of the table shows the practice the pupil gets if he adds the same examples upward. Likewise, Table II reveals the practice in higher-decade addition in the twenties which is provided by the drill materials of Set B, the upper portion indicating the combinations if one adds

TABLE I

HIGHER-DECADE ADDITION COMBINATIONS IN THE TWENTIES IN THE EXAMPLES OF SET A

Larger Addend	Smaller Addend										Total
	0	1	2	3	4	5	6	7	8	9	
	ADDING DOWNWARD										
20	1	4	8	5	7	5	11	12	10	13	76
21	1	2	6	3	5	8	7	7	9	9	57
22	1	8	10	9	3	9	8	5	9	10	72
23	1	3	9	7	3	3	6	15	7	7	61
24	1	5	6	3	....	3	6	6	2	7	39
25	....	3	3	2	2	3	7	6	3	8	37
26	....	5	3	3	2	4	7	8	7	8	47
27	2	....	4	3	1	2	7	....	1	3	23
28	....	1	2	1	....	3	2	1	1	3	14
29	....	....	1	1	2	6	....	2	4	1	17
Total	7	31	52	37	25	46	61	62	53	69	443
	ADDING UPWARD										
20	4	2	2	5	7	4	7	11	6	8	56
21	....	2	6	1	3	3	9	11	16	7	58
22	....	5	8	3	4	14	2	10	9	8	63
23	2	5	4	3	2	6	5	7	4	8	46
24	....	1	2	2	7	6	6	3	7	8	42
25	4	....	5	7	4	3	7	3	6	3	42
26	1	2	3	....	5	3	1	4	6	2	27
27	1	....	1	3	4	3	4	5	10	7	38
28	2	....	1	2	3	1	6	6	4	1	26
29	....	....	4	....	1	....	1	6	4	2	18
Total	14	17	36	26	40	43	48	66	72	54	416

downward and the lower portion, the combinations if one adds upward. Table III shows similar facts for Set C.

Do these tables indicate that practice on those higher-decade-addition combinations whose larger addends are in the twenties is distributed according to some prearranged plan? Or was the distribution of practice on these combinations left to chance? Before answering these questions let us examine the first part of Table I more closely.

There are just 100 of the combinations with which we are concerned. In these 100 combinations, each of the 10 one-digit numbers, 0 to 9, inclusive, is added to each of the 10 two-digit numbers, 20 to 29, inclusive. The 100 combinations occur a total of 443

TABLE II

HIGHER-DECADE ADDITION COMBINATIONS IN THE TWENTIES IN THE EXAMPLES OF SET B

Larger Addend	Smaller Addend 0	1	2	3	4	5	6	7	8	9	Total
	ADDING DOWNWARD										
20	9	5	6	9	7	7	6	7	13	16	85
21	4	6	7	2	4	3	8	4	4	8	50
22	7	4	6	7	3	7	4	5	12	9	64
23	7	4	3	5	8	7	3	8	6	6	57
24	5	3	4	6	3	5	7	6	5	9	53
25	2	3	4	3	3	6	6	8	6	8	49
26	1	4	3	1	3	4	7	3	1	1	28
27	7	9	5	5	3	7	6	5	7	3	57
28	2	4	4	5	4	3	2	5	3	4	36
29	6	5	1	1	2	1	2	3	8	4	33
Total	50	47	43	44	40	50	51	54	65	68	512
	ADDING UPWARD										
20	3	5	6	9	6	11	9	5	7	7	68
21	5	7	2	2	12	6	5	4	4	5	52
22	7	1	7	7	3	6	6	4	6	5	52
23	7	10	7	8	4	3	5	4	6	8	62
24	8	8	5	5	2	9	4	7	8	4	60
25	8	8	4	6	5	11	11	8	10	14	85
26	6	4	3	3	3	7	11	5	10	6	58
27	3	2	2	3	1	5	3	8	7	2	36
28	....	....	3	2	1	2	5	7	2	....	22
29	2	3	5	3	1	2	1	2	2	2	23
Total	49	48	44	48	38	62	60	54	62	53	518

times, an average of over four times each. But ten of the 100 combinations do not occur at all. Surely, no plan of systematic practice should omit ten percent of the combinations when the total number of occurrences is more than four times the total number of combinations.

Note also the great variation in the numbers which form the entries in the table. Consider the column headed by the number 7, for instance. Seven is added to 20 twelve times; to 21, seven times; to 22, five times; to 23, fifteen times. Why should a pupil have fifteen practices in adding 7 to 23 in the course of a year and

no practice at all in adding 7 to 27? Or, why should a pupil have twelve practices in adding 7 to 20 and only one practice in adding 7 to 28? If a system was followed in providing for the addition of 7 to numbers in the twenties or in providing the practice shown in any other column of the table, it is difficult to tell what it was.

Examine the total column at the right. A one-digit number was added to 20 seventy-six times, but to 29 only seventeen times.

TABLE III

HIGHER-DECADE ADDITION COMBINATIONS IN THE TWENTIES IN THE EXAMPLES OF SET C

Larger Addend	Smaller Addend 0	1	2	3	4	5	6	7	8	9	Total
	ADDING DOWNWARD										
20	....	3	1	2	6	1	6	6	3	5	33
21	....	....	1	1	2	2	5	4	3	4	22
22	....	....	....	2	....	2	1	2	6	7	20
23	....	....	....	1	2	3	2	6	4	11	29
24	1	....	....	1	1	2	4	8	11	4	32
25	....	....	....	1	....	3	3	5	5	5	22
26	....	....	....	2	....	4	8	3	1	6	24
27	....	....	1	....	2	....	6	5	6	7	27
28	....	....	....	1	1	1	2	2	5	1	13
29	....	1	....	....	....	1	....	1	1	2	6
Total	1	4	3	11	14	19	37	42	45	52	228
	ADDING UPWARD										
20	1	3	....	2	1	4	2	4	5	4	26
21	....	4	2	2	3	4	5	6	7	4	37
22	....	2	3	2	2	5	5	4	1	7	31
23	....	1	1	1	3	3	4	3	9	10	35
24	....	2	2	2	1	2	3	4	4	7	27
25	....	....	1	2	3	1	3	5	5	6	26
26	....	1	....	1	....	4	4	5	3	7	25
27	....	....	2	1	2	2	3	3	3	5	21
28	....	1	1	1	2	3	1	5	4	5	23
29	....	1	1	1	1	2	2	4	3	1	16
Total	1	15	13	15	18	30	32	43	44	56	267

There are irregularities in this column, but in general there is less practice on the higher twenties than on the lower twenties. A degree of this condition is necessary, or the sum of the entire column is frequently a number in the lower twenties; but one wonders whether seventeen practices in adding a one-digit number to 29 is sufficient. If it is, surely seventy-six practices in adding a one-digit number to 20 are not necessary, nor seventy-two practices in adding

a one-digit number to 22. Again, it is difficult to justify the author's plan, if he had one.

Look, now, at the line of totals for the upper portion of the table. In general, the larger one-digit numbers are added to a number in the twenties more frequently than are the smaller one-digit numbers. This seems to be a justifiable condition for, in general, the addition of the larger digits is more difficult than the addition of the smaller digits, but there are marked irregularities in this line of totals. Why should 2 be added 52 times and 4 only 25 times, less than half as often? Why should 2 be added about as frequently as 8 and 1 more frequently than 4? Furthermore, the addition of 0, a very troublesome case, occurs only seven times. Can this be justified?

So far as Set A is concerned, it does not seem to matter whether one adds up or down. The situation is bad in either case as may be seen by examining the respective parts of Table I. Set B (both parts of Table II) is better in some respects. Every one of the 100 combinations receives some practice if the pupil adds downward, and only three of them are omitted if he adds upward. Strangely, however, the author of Set B seems to assume in some of his explanations that the pupil will add upward. Zeros occur much more frequently in the examples of Set B than in the examples of Set A or Set C. In Set B, again, the distribution of practice is very ragged, for, if the pupil adds downward, he adds 9 to 20 sixteen times but 9 to 26 only once. If he adds upward, he will add 9 to 25 fourteen times but does not have a single opportunity to add 9 to 28. Set C has only one occurrence of a zero combination, and several others fail to occur at all. Again, the distribution of practice is very irregular.

There is one other significant bit of information revealed by our tables, that is, the extent to which practice is provided on those combinations which involve bridging. "Bridging" or "bridging the ten's" is a term used to indicate the type of addition involved when the sum of a higher-decade combination is in the decade next above that of the larger addend.[2] Those combinations which involve bridging are much more difficult than those whose sums are in the same decade as the larger addend. Should they not, therefore, receive more practice than the easier combinations?

Of the 443 occurrences in Table I, adding downward, 188 or 42 percent involve bridging. If the pupil adds upward, 45 percent of the combinations require bridging. The corresponding percents for Table II are 43 and 43; for Table III, 67 and 57. For the data

[2] This term is also sometimes applied to those of the 45 fundamental combinations whose sums are 10 or more.

of the three tables as a group, 47 percent of the occurrences involve bridging. Now, we bridge in 45 of the 100 combinations with which we are concerned. An even distribution of practice would mean that we should bridge in 45 percent of the total number of occurrences. The actual percent is somewhat higher than this for the data of the six tables as a group, due, largely, to the influence of Set C. For Sets A and B, the percents are 45, or lower, in each case. We can hardly say, then, that special attention has been given to combinations involving bridging except in the case of Set C.

The writer has been asked, "Which of these three sets is best for teaching higher-decade addition?" The answer is, "None." No one of them is good; and if we cannot speak in the positive degree why should we be asked to indulge in comparatives and superlatives? If we may change the adjectives, however, we may say that as far as provision for training in those higher-decade addition combinations whose larger addends are in the twenties is concerned, Set B is bad, Set A is worse, and Set C is worst.

Despite the pessimistic vein of these remarks, the writer is most hopeful of the future of the teaching of arithmetic. Much has been done already toward psychologizing the teaching process; but much more remains to be done. While we are waiting for the experts in research to complete their work, let us examine critically the "cures" which ambitious authors have prescribed and which enterprising publishers have marketed. Because one has access to data on the difficulty of the 100 primary addition facts, it does not follow that he is in a position to prescribe for all of our arithmetic ills. And many of the extravagant claims which are being made in the teachers' manuals which are designed to accompany practice materials should be materially toned down; they should accord accurately and very specifically with the facts.

In conclusion, we may remark that we need more organizations and more people devoting their energies to research. Every set of practice materials and every textbook which comes on the market should be analyzed minutely. We should know, for each of them, the frequency of occurrence of each of the primary addition facts and each of the higher-decade combinations included, as well as the extent to which carrying, the addition of addends of unequal length, and attention span are provided for. We should also have such details for each of the other operations, information on the distribution of practice, and analyses of vocabularies. In the meantime, the process of education must go on but must use available materials in ignorance of what they contain.

SEX DIFFERENCES IN INTELLIGENCE-TEST SCORES IN THE ELEMENTARY SCHOOL

GUY M. WHIPPLE
Director of the National Intelligence Tests

THE outcome of any intelligence test may be regarded as conditioned by a series of factors, such as age, sex, native ability, school training, practice, and race. Of these factors, comparatively little attention has been paid to sex, perhaps because the sex difference was regarded as of little magnitude or of little practical import. In the classifications of pupils, for example, the scores of either sex have been, doubtless quite properly, compared with the single standard score for the age or grade in question, which has been itself derived from the scores obtained by hundreds of children of both sexes combined, to furnish the standard age score or the standard grade score.

Most investigators, however, have been aware of the existence of a small sex difference, and this difference has at least an academic interest when it is considered in its possible theoretical relations to the rate of physical and mental maturity of the two sexes during childhood and adolescence. Moreover, it possesses still greater interest when the direction of the sex difference is discovered to be reversed in the secondary school. It seems worth while, therefore, to assemble pertinent facts concerning the sex differences in elementary-school scores and then to compare this situation with that revealed in the high school. In this paper, accordingly, I shall present facts concerning two well-known intelligence tests designed for elementary-school use, namely, the National Intelligence Test, Scale A, and the Illinois General Intelligence Scale. Subsequently, I shall present facts concerning sex differences discovered by the use of Army Alpha in the high school.

SEX DIFFERENCES IN THE NATIONAL INTELLIGENCE TEST

One method of measuring the sex difference is to limit consideration to a single chronological age, and to take special pains to locate and test every pupil of that age in the school systems studied. For this purpose, eleven years provides a desirable age, since practically every pupil of that age is enrolled in a school system and may be reached and examined. It is desirable, of course, to gather such scores from more than one community.

The subjects.—We shall deal here with scores obtained from four communities, as given in the following paragraphs:

1. In conjunction with a survey of the public schools of Flint, Michigan, undertaken by the School of Education of the University of Michigan, the writer supervised the application of Scale A of the National Intelligence Tests to every eleven-year-old pupil in that city, regardless of his location in the school grades; even pupils of this age in the special classes were tested. This undertaking provided scores from 782 pupils of which number 377 were boys and 405, girls.

2. Through the courtesy of the Director of the Department of Measurements, a similarly complete set of scores was obtained from all the eleven-year-old pupils in the city of Jackson, Michigan—236 boys and 238 girls, a total of 474 scores.

TABLE I

MEDIAN SCORES OBTAINED IN NATIONAL INTELLIGENCE TESTS, SCALE A, BY ELEVEN-YEAR-OLD PUPILS IN FOUR CITIES

CITY	BOYS		GIRLS		EXCESS SCORE OF GIRLS
	Number	Median	Number	Median	
(1)	(2)	(3)	(4)	(5)	(6)
Flint	377	78.0	405	95.0	17.0
Jackson	236	85.9	238	94.4	8.5
Kansas City	349	105.1	359	108.9	3.8
Lafayette	109	95.8	125	99.0	3.2

3. Reports obtained from those in charge of intelligence testing in Kansas City, Missouri, gave the scores of 708 pupils, 349 of whom were boys and 359, girls. While all of these pupils were eleven years of age, I am not able to state how comprehensively the tests were administered; apparently, no attempt was made to test eleven-year-old pupils in the special classes or in Grades I and II. In any event, in whatever ranges of grades and schools were tested, both sexes were included.

4. The same comment as that given in the preceding paragraph may be made concerning the scores of 234 pupils—109 boys and 125 girls—reported from Lafayette, Indiana.

The results.—In Table I these scores just mentioned have been summarized to show the sex difference obtaining in the median scores for each of the four cities. It will be seen that in each city the girls' median exceeds the boys' median, and that in Flint and

Jackson, where the entire eleven-year-old population was reached, the girls' excess reached a considerable amount, 17.0 and 8.5 points of score, respectively.

In order to show that the sex difference operates generally throughout the range of scores, the 2,198 scores of 1,071 boys and 1,127 girls from the four cities have been combined and distributed in the form of a percentile curve, which is summarized in tabular form in Table II and exhibited in graphic form in Figure 1. It will be seen that, although the extreme scores recorded for boys and for girls are identical, or substantially so, the distribution is such that

TABLE II

PERCENTILE DISTRIBUTION, BY DECILES, OF SCORES OBTAINED IN NATIONAL INTELLIGENCE TESTS, SCALE A

Percentile	Boys	Girls
(1)	(2)	(3)
Minimum	0	0
10th percentile	37	49
20th percentile	58	68
30th percentile	71	80
40th percentile	81	91
50th percentile	91	100
60th percentile	101	108
70th percentile	111	116
80th percentile	120	125
90th percentile	132	137
Maximum	174	172
Number of cases	1,071	1,127

the scores for the girls are higher than those for the boys at all other deciles. The sex difference at the median, 50th percentile, amounts for this entire group to 9 points. Since at this age the yearly increment of score is 15 points, it follows that the median eleven-year-old girl attains a score in the National Intelligence Test which indicates a grade of mental maturity approximately seven months in advance of boys of the same age.

Practical significance.—In practice, it is probably not worth while to consider the sex difference when classifying pupils. However, as we have said elsewhere, "in handling scores from pupils of one sex, as in private schools for boys only or for girls only, the shifting of the standards, in accordance with the figures just given,

may be recommended."[1] This shifting would obviously mean that the published age standards should be increased 4.5 points for girls and decreased 4.5 points for boys, since the standards in question have been obtained from groups composed of substantially an equal number of each sex.

THE ILLINOIS GENERAL INTELLIGENCE SCALE

The subjects.—In the course of a recent revision of the Directions for the Illinois General Intelligence Scale,[2] opportunity was afforded to compare the scores of the sexes in a group of 1,919

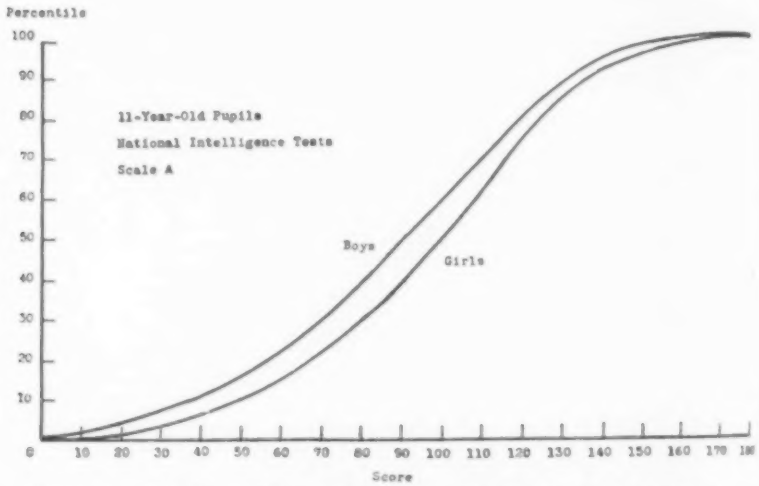

Figure 1. Sex Percentiles of Eleven-Year-Old Pupils in the National Intelligence Tests. Based on Table II.

pupils in the public schools of Bloomington, Illinois, and 582 pupils in Grade IX-B of the public schools of Indianapolis. The Bloomington pupils ranged in age from eight to thirteen years and in grade from III-B to VIII-B.[2] The Indianapolis pupils comprised all those in Grade IX-B of that city.

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[1] *Supplement No. 3 to the Manual of Directions, National Intelligence Tests.* The sex difference in this reference was taken as 7, instead of 9, points.

[2] *Illinois General Intelligence Scale: Manual of Directions.* Prepared, 1920, by B. R. Buckingham, and revised, 1926, by Guy M. Whipple and Helen D. Whipple.

The results.—The scores for these pupils have been arranged in two tables with reference to averages only, but in such a way as to show how the sex difference appears in each age from eight to thirteen and in each grade from III-B to IX-B. The former is given in Table III and the latter in Table IV. Inspection of these tables will show three features of interest that are brought out here. The girls' averages exceed the boys' averages at every age and

TABLE III

SEX DIFFERENCES IN AVERAGE POINT SCORES AT VARIOUS AGES

AGE IN YEARS	NUMBER OF CASES		AVERAGE POINT SCORE		
	Boys	Girls	Boys	Girls	Girls' Excess
(1)	(2)	(3)	(4)	(5)	(6)
8	110	131	27.40	30.93	3.53
9	167	118	38.22	40.89	2.67
10	164	188	46.45	50.16	3.71
11	155	175	62.03	66.42	4.39
12	171	184	68.84	76.97	8.13
13	166	157	76.45	84.19	7.74

TABLE IV

SEX DIFFERENCES IN AVERAGE POINT SCORES IN VARIOUS GRADES

GRADE	NUMBER OF CASES		AVERAGE POINT SCORE		
	Boys	Girls	Boys	Girls	Girls' Excess
(1)	(2)	(3)	(4)	(5)	(6)
III-B	108	110	20.19	23.55	3.36
IV-B	107	105	34.71	37.57	2.86
V-B	83	99	51.39	52.65	1.26
VI-B	111	123	63.84	65.21	1.37
VII-B	96	125	78.35	80.36	2.01
VIII-B	113	116	85.32	91.05	5.73
IX-B	261	321	88.76	92.62	3.86

in every grade. The superiority of the girls increases markedly at the age of twelve, where it is almost double that at age eleven, and is also marked at thirteen, presumably reflecting in these two ages the earlier pubertal acceleration of girls.[3] The superiority of the

[3] This makes it extremely probable that a similar increase in the excess score for girls would be found in the National Intelligence Test, had data been available for age twelve instead of age eleven. It also raises the question whether the differences in the amount of the girls' superiority at the age of eleven reported from the four cities might not be conditioned in part by differences in the age of pubertal incidence in the four communities, which might, in turn, be conditioned by differences in the racial composition of the four communities.

girls is much less marked when the averages compared are those of grades instead of ages. The explanation of this feature would seem almost certainly to lie in the promotional criteria employed in these schools. That is, in so far as the classification of pupils is operated successfully to secure homogeneity of pupil capacity, there will result a tendency to promote girls somewhat more rapidly than boys, or, in other words, more boys will be chronologically retarded than girls. Put more concretely, the annual increment of score in the Illinois Scale is 10 points. Since twelve-year-old girls average 8.13 points higher in score than do twelve-year-old boys, these girls are mentally more than nine months older than boys of their own chronological age. This excess in mental maturity, or mental competence, is naturally reflected to some degree in the school-grade status of the two sexes.

COMMENTS

Various reasons may be advanced to account for this sex difference. It may be argued, for example, that the intelligence test favors the more industrious or studious pupils and that girls as a group are more industrious and studious—or, if you like, more docile—than boys. On this hypothesis, the difference in score really measures a difference in a dispositional or non-intellectual trait. Again, it may be argued that the score is conditioned in part by the appeal of the subject-matter and that the content of the typical group intelligence test is such as to appeal more to girls than to boys, quite apart from any difference in docility or studiousness in the daily work of the school. It may also be argued that, just as girls reach maturity in height, weight, and other physical features earlier than do boys, so similarly, they are mentally more mature than boys at almost any stage of development. Finally, it may be argued that girls, as a group, are intrinsically slightly superior to boys, regardless of any possible additional factors, like rate of maturity or docility. Whatever be the merits of these hypotheses, it seems evident that one of these factors, sex differences in rate of maturity, certainly does operate in producing the results we have exhibited.

In view of this uncertainty of explanation, it is admitted that what has just been presented concerning sex differences in elementary-school intelligence-test scores is an incomplete survey of the topic. Enough has been said, doubtless, to demonstrate the existence of a persistent sex difference, current in any community,

in every grade reached by group tests, and displayed with special clearness in those years when girls precede boys in entering the period of puberty. What we need, however, to understand the situation adequately, and especially to compare performance in these test scores with performance in educational tests and in intelligence tests applied to secondary-school pupils, is an analysis, year by year, of the scores in each of the several tests within the total scale, and possibly of each item within each test. The material at my disposal did not permit such an analysis, but that it would be fruitful, I shall show in another article dealing with sex differences in Army Alpha scores in the high school.

THE TRAINING OF CRITIC TEACHERS IN THE UNITED STATES

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A teacher-training institution is essentially a vocational school. It is a technological institution established for the purpose of giving the students the necessary knowledge of society and its needs and the required skills in the technique of teaching, to enable them to produce for the state an increasingly large number of "good citizens."

Teaching is a highly technical and specialized process. It is the finest of the fine arts and requires a number of delicately established skills. History shows that we have really had but few teachers, that most of the individuals of society have taught themselves, that the school, as a highly technical institution for the purpose of selecting and passing on useful traditions of society, has only started. But civilization is becoming more and more complex, and, if it is expecting even to retain its present status—not to mention the possibility of progress—it must make of its teachers' colleges technological institutions whose product becomes more and more skilled as the years come. Just any one cannot teach, although just any one can talk.

Teachers' colleges cannot be mere information-disseminating factories where an individual may go and cram his memory with sufficient facts to pass a certificating examination. Their duty is to send out into the schools of the country—the high schools and the elementary schools—men and women who not only have the necessary information but also have a dynamic living knowledge of society.

Teacher-training institutions must be in reality sociological laboratories in which a thorough study of various societies in our civilization is made and understood. Such institutions should be research laboratories and continuously carry on investigations, research projects, and school surveys in all parts of the state with a view to learning the actual needs of specific situations. While teachers' colleges are technological schools, they are not mere method nor device factories. Their duty is first to formulate and develop an educational philosophy and then devise a sound methodology as a means by which to attain their ends. They are as much vocational and technical schools as an agricultural college or a

college of engineering. Their purpose requires that their curriculum be as broad as all the teaching interests of the state. They should not attempt to furnish agricultural nor engineering experts to society any more than agricultural or engineering or law schools should attempt to furnish teachers. But their scope should be broad enough to furnish the philosophy and methodology for all teachers—teachers of agriculture, of engineering, and of law as well as of other subjects. Their duty is to furnish to the state its teachers.

Until a comparatively few years ago teaching was not considered an important or technical process, and but little attention was given to the organization, administration, and supervision of instruction. Teachers received their preparation for the classroom by hit-or-miss methods, and no accounting was made of the financial expenditure or waste in human time and effort in the learning. The idea that one had to be trained for the work of a teacher, just as a dentist must be trained for his work, met with considerable opposition. A knowledge of subject-matter was considered enough. "If one knows his subject he can teach it" was the common opinion.

A similar attitude is largely maintained at the present time regarding critic teachers, judging from the manner in which they are trained and selected. Now, if it is necessary that those who teach arithmetic should have not only a knowledge of arithmetic but also a knowledge of how to teach arithmetic, it seems much more necessary that those who teach teachers how to teach should not only have a thorough knowledge of subject-matter in the field of education but also a knowledge of technical skills in how to train teachers how to teach, for this is the duty of the critic teacher. There is a difference between teaching arithmetic to students, and teaching men and women the art of teaching arithmetic. The time is not far distant when parents will be as unwilling to trust their children to the care of a non-technically trained teacher as they would now be unwilling to risk allowing an untrained and unlicensed surgeon to operate on their children.

Assuming this function and standard of a teachers' college, the writer undertook an investigation in the academic year 1925-26 to determine the character and extent of the training which critic teachers have received. The questionnaire blank[1] was sent to each critic teacher in each of the eighty-one four-year teachers' colleges listed in the *Educational Directory* for 1925.

[1] These questions are given at the end of this atricle (p. 125).

The total number of blanks returned by the critic teachers of these institutions was 368. The information here given is representative of every section of the United States and its possessions.[2] The blanks when returned were tabulated on the basis of the grade in which the critic did her work, that is, primary, intermediate, and high school. A number of graphs and tables were prepared from the data secured; only the most important of these are given herewith.

The second question of the questionnaire blank yields several interesting facts. The average length of time the critic teachers had been in their present positions was 4.1 years; the average of previous experience was 8.3 years. Thirty percent of these teachers had had less than six years of previous experience in any kind of teaching work including classroom teaching and critic teaching; 39 percent had had from six to ten years of experience; and 31 percent had had more than ten years. Of the entire group of teachers, 27 percent had been in their present positions one year or less; 21 percent, from one to two years; 22 percent, from two to four years; 15 percent, from four to six years; this leaves about 15 percent who had been in their present positions more than six years.

Approximately 83 percent of the critic teachers, in replying to Question 3, stated that student-teachers, when they enter upon the work of preparation for teaching are insufficiently prepared for professional training. Some younger critics seem to think that student-teachers have adequate preparation in content of the subjects they are preparing to teach, while older critic teachers, those with much more experience, agree that student-teachers do not have sufficient knowledge of subject-matter. It is not clear whether this difference of opinion is due to the fact—which is probably true—that the younger or more inexperienced critics are not sufficiently skilled to see such weakness or whether the critics with long experience have different ideals of what constitutes a proper knowledge of subject-matter. Tabulations of the answers to the third question show that 17 percent of these critic teachers believe the students are sufficiently prepared, that 56 percent believe they are not, and that 21 percent believe they are not always sufficiently prepared, while the rest did not answer the question.

[2] The writer wishes to thank the critic teachers throughout the United States for the thoroughness with which they have responded to the request for these data.

The most common recommendations of these critic teachers as to what student-teachers should have was "more and better knowledge of subject-matter and especially a better organization of it." This item was mentioned 153 times. Other items of importance were recommended, such as special methods, observation of teaching, more English, more psychological theory. Normal training in the high-school course, courses in project method, and supervision courses received only scant mention.

The weakest parts of the uncertain curriculum, now set up for the preparation of critic teachers according to the opinions expressed in the replies to Question 4, in order of their importance, were: (1) lack of courses dealing with critic and practice teaching, (2) too much theory and not enough practical application, (3) lack of training in general methods, (4) lack of training and experience in critic work, and (5) lack of knowledge of organization and construction of the curriculum of public schools. Those mentioned least often were: (1) lack of practice in classroom management, (2) insufficient elimination of weak students before they are allowed to do critic work, (3) the lack of understanding of what critic work is, and (4) the lack of a proper knowledge of methods of diagnosis.

The information furnished from answers to Question 5 indicates the sorts of courses now offered in preparation for critic work. Some of the most important were courses in general supervision, special methods, tests and measurements, general psychology, and practice teaching. Those receiving least mention were courses in public speaking, personnel administration, and vocational psychology.

Answers to Question 6 supplied data used in making Figure 1. At the left of the graph are listed the courses which critic teachers think they should have had as preparation for critic work. The scale represents the importance of these subjects.

On the second page of the questionnaire, an extensive table was given in which the critic teachers were asked to record their ratings on certain of the usual professional courses given in teachers' colleges according to their relative importance in aiding in the solutions of problems which arise in five sorts of teaching situations: (1) planning the work of the recitation hour, (2) conducting the recitation, (3) dealing with individual pupils in matters of discipline or methods of instruction, (4) cooperating with the administrative officers or faculty, and (5) participating in other school activities. Six degrees of frequency were listed by which the

importance of the subjects was to be rated: very often, often, occasionally, seldom, very seldom, never. The judgments of the teachers who completed the questionnaire are summarized in Figure 2. The ratings of each subject in the five situations are combined in the respective bars of the diagram.

Question 7 gave a list of 78 ideals that critic teachers have in mind to develop in student-teachers under their supervision. The list is too long to mention here but some are: to develop an understanding of children and child-life; to develop a professional atti-

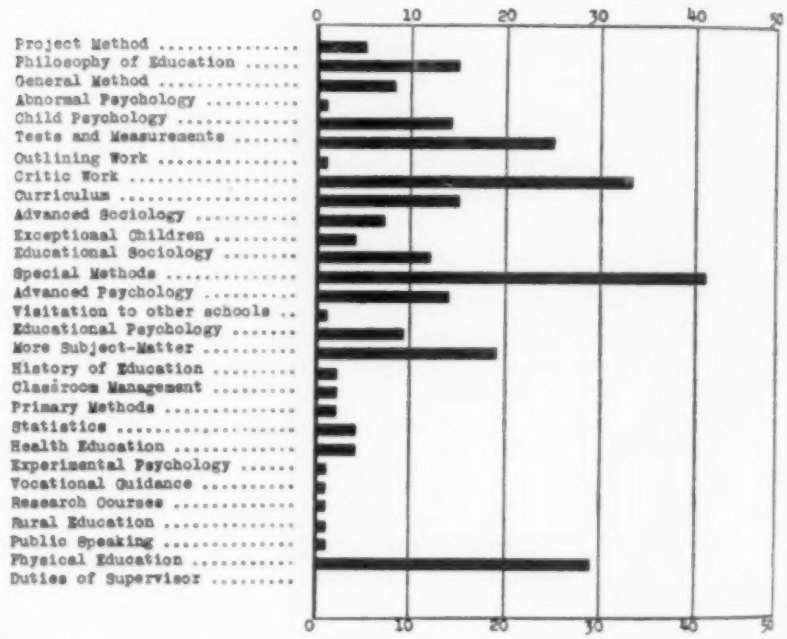

Figure 1. Relative Importance of the Subjects Now Needed by Critic Teachers in Their Work But Which They Did Not Have in Their Professional Training

tude in student-teachers; to develop an attitude and desire for thorough preparation; to develop a sense of responsibility, loyalty, and cooperation; to develop citizenship; to develop initiative; to develop self-confidence; and to develop the ability to see the child grow.

There are certain inferences which may be drawn from the remarks written on the blanks which these critic teachers have returned, represented by the data in graphic form. Most critics have had little or no training for criticizing a student-teacher's efforts at teaching before taking the position of critic teacher. It would appear that the training which critic teachers, in general, have had is not different training from that given the ordinary classroom teacher. That is to say, any one who has taken the conventional courses in a teachers' college is as well prepared for the

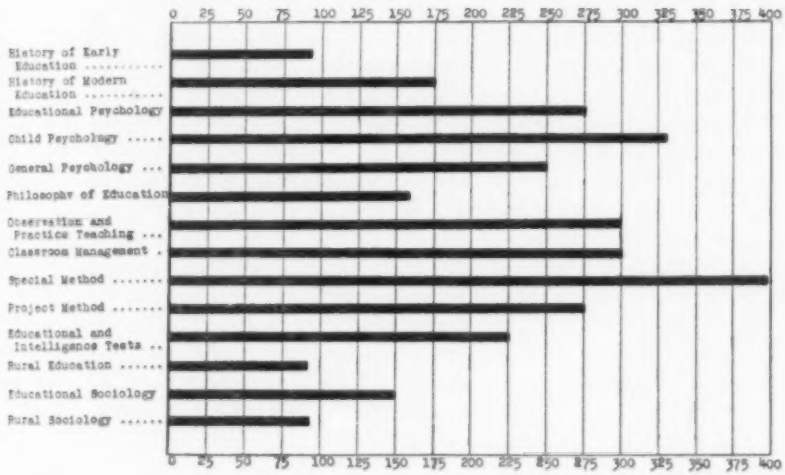
0 25 50 75 100 125 150 175 200 225 250 275 300 325 350 375 400
History of Early Education
History of Modern Education
Educational Psychology
Child Psychology
General Psychology
Philosophy of Education
Observation and Practice Teaching
Classroom Management
Special Method
Project Method
Educational and Intelligence Tests
Rural Education
Educational Sociology
Rural Sociology
0 25 50 75 100 125 150 175 200 225 250 275 300 325 350 375 400

Figure 2. Relative Importance of These Subjects in Meeting Certain Teaching Situations

task of the critic as these teachers who are now doing this highly technical work. Of course there are a number now in important critic positions who have been thoroughly trained and who are excellently prepared for their work, but they are the exceptions.

The tendency, apparently, has been to select critic teachers from successful grade- or high-school teaching positions, teachers who have had little or no critic training. To be sure, one should have proved himself a successful teacher before undertaking to demonstrate the processes of teaching or to presume to criticize another's teaching. It does not necessarily follow, however, that one who knows how to teach arithmetic knows, also, how to critize another teacher's work. This is an important consideration, for many teach-

ers are promoted from grade positions to critic positions with no more special preparation than that given in the conventional courses of the teachers' college. The lack of training on the part of critic teachers, at the present time, is probably parallel to the lack of professional training which was characteristic of grade- and high-school teachers of a generation ago.

It would seem that we are not yet "out of the woods" so far as professional training of critic teachers is concerned. One could count on the fingers of one hand all the colleges or universities that are offering courses expressly designed to prepare critic teachers. This conclusion is reached from facts gleaned from the catalogues of higher institutions throughout the country. A perusal of these catalogues will convince any one of this statement. The writer is confident that if one should investigate the training of the supervising critics in any school system, chosen at random, a similar situation would probably be revealed. It is maintained that a supervising critic in a well-organized school system should have preparation for her work similar to that of the critic teacher.

The writer has been unable to find any reports of a thorough job-analysis of the critic teacher's duties. Only small beginnings have been made in working out a scheme.

According to their own statements, most critic teachers seem to need more work in tests and measurements, or at least instruction in standards for evaluating the progress of student-teachers.

Critic teachers should at least have a baccalaureate degree or its equivalent, preferably a Master's degree in addition. If one may judge from personal data contained in the catalogues, a large number have neither degree. A good indication, however, of an elevation of standards is shown in the number that have attended summer schools.

There seem to be few, if any, specific courses for the critic teacher. Only 3.5 percent of the critic teachers have taken courses primarily designed for their work. The average or general course offered by most teachers' colleges covers all subjects listed by these teachers as preparation for their work. It is not claimed that general courses in supervision and special methods do not help the critic teacher. They are or should be taken for granted as part of their preparation. But the point is that most teachers who instruct student-teachers should have, in addition to the courses usually offered by teachers' colleges, courses in personnel management and methods of criticizing student-teachers. They should likewise be capable of demonstrating proper procedure.

Critic teachers in the same school generally have similar ideas concerning the improvement of the critic teachers' training program—doubtless the effect of personal contacts.

This study is concerned chiefly with the use of certain professional subjects given in graduate and undergraduate schools of education. It appears that rural education, rural sociology, educational psychology, and history of education are the least useful in the situations which confront the critic teacher.

A PORTION OF THE FIRST PAGE OF THE QUESTIONNAIRE BLANK SENT TO CRITIC TEACHERS

1. What critic teaching do you do, that is, what grade or subjects in high school or elementary grades?.....
.....

2. How many years' teaching experience had you had before becoming a critic teacher?..... How long in your present position?.....

3. Does your experience show that those student-teachers who come to you have had adequate preparation for the work you give them?..... What would you recommend that they have in addition as preparation?.....

4. What, in your opinion, is the weakest part of the curriculum for the preparation of critic teachers?.....

5. List on the back of this or on a separate sheet all courses taken solely as preparation for critic work. Give number of months you studied each.

6. Name other courses than those listed in No. 5 which you think you need that you did not study. .....

7. Do you have any definite ideals to develop in your work with student-teachers? State them. .....
.....

THE GIFTED CHILD

II. PRESENT SCHOOL PROVISION FOR THE GIFTED CHILD

DORTHA WILLIAMS JENSEN
Stanford University

A survey of educational literature reveals a present tendency toward the formation of special classes as the prevailing school provision for gifted children.[1] From time to time the reports of questionnaires concerning special classes have given data on the provisions for bright children within the schools,[2] and descriptions of such classes in twenty-five cities have also appeared. No recent and comprehensive data on the status of such classes were available, when desired by the writer, in 1924, but since then an account, of a questionnaire on the methods of selecting bright children for special classes, has appeared (15). Although it covers in some detail one phase of the subject, there is little overlapping with the study considered in this article, for the investigation here described was undertaken with the purpose of securing recent and comprehensive data concerning special classes for gifted children.

In order to obtain the information from as large a population as possible with a minimum amount of effort, a preliminary questionnaire was sent to the superintendents of schools in all cities of the United States having a population of twenty thousand or more,[3] and, also, to those cities of less population which had already been mentioned in the literature on the subject. In all, 413 questionnaires were distributed, of these, 367 were sent to cities of twenty thousand or more. Not only was the number of cities having special classes desired, but information regarding other types of provision for the gifted was also sought.

The form sent out is quoted here:

Dear Superintendent:

As a research student in the Department of Psychology of Ohio State University I am making a study of the gifted child in the public schools of this country. In this connection I shall very much appreciate having your answers to the following questions:

1. Do you have, or have you ever had, in your school system any provision for special instruction for the bright or gifted child?

[1] *See* the article entitled "The Gifted Child: I. Educational Concepts and Practices," *Journal of Educational Research*, 15:34-45, January, 1927.

[2] *See* citations 10 through 18 in appended bibliography.

[3] The list was obtained from *1920 Census Report.*

2. If so, do you have: (1) special classes and teachers? ..... (2) the so-called X-Y-Z classes?..... or (3) some other method of recognizing brightness in children? .....

I assure you that I shall be very grateful for the cooperation shown by sending me this information.

Replies were received from 220 of the 413 cities to which the questionnaire was sent: 25 were from the 46 cities having populations of less than twenty thousand; and 195, from the 367 cities having a population of twenty thousand or more.

The percent of replies received from various groups of cities,[4] is indicated by the following tabulation:

Population of Cities	Percent Replying
Less than 20,000.....	54
20,000– 49,999.....	47
50,000– 99,999.....	53
100,000– 499,999.....	70
500,000–1,000,000.....	67
More than 1,000,000....	100

The classification of the types of provision, mentioned in the replies, proved to be rather difficult because of the overlapping between them and the wording of the descriptions of the various sorts of provision. The following categories used in presenting the data in Figure 1 seemed to provide the most feasible arrangement:

1. No provision
2. Provision by promotion, enrichment, etc.
3. Homogeneous grouping, promotion by subjects
4. X-Y-Z classes
5. Special classes

Each city has been placed in but one category—that in which it seemed best to fit. The additional information given in many cases is very interesting and perhaps of considerable significance, but space will not permit its discussion.

Brief comments on the types of provision represented by the various categories will add significant supplementary facts. Of the 47 cities reporting that they have no provision for the gifted, some have special classes for the dull. A wide range of provision is

[4] With the exception of cities of less than twenty thousand, these data represent percents of the total number of cities of the various sizes in the United States.

represented in the 33 cities reporting that extra promotions were allowed to the gifted. They extend from occasional more-than-earned promotions in some school systems to a system of extra promotions at Kearny, New Jersey. Fine distinctions cannot be justly drawn here. Wide range is probably also indicated by the use of the term "enrichment" by 11 cities, for its nature and extent are not usually described. A combination of extra promotions with "helping teachers," who perhaps work with the dull as well as the bright, was reported by four cities. In the six school systems which report summer schools and extra promotions as the only means of provision for the gifted, it is stated that sometimes very bright pupils are able to do the work of one semester in summer school and thus obtain extra promotions.

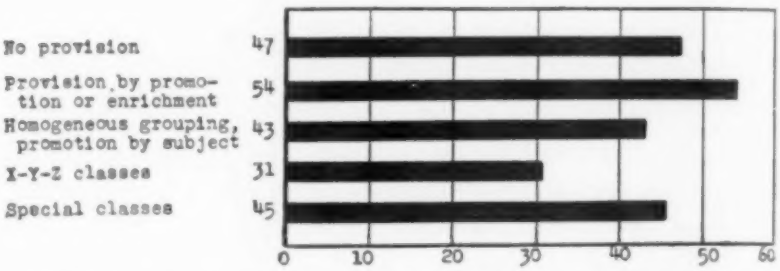

Figure 1. Types of Provision Made for Gifted Children in the 220 Cities

Some form of homogeneous or ability grouping is mentioned by 23 school systems. Besides grouping pupils according to ability, 16 school systems occasionally give extra promotions to pupils who show exceptional ability. The plan of promoting pupils by subject is almost universal in our high schools. In 4 school systems replying to the questionnaire, it is used in the elementary school as well, the purpose being to keep pupils working with those of approximately the same abilities.

So far has the idea of a definite plan of homogeneous grouping progressed that 20 cities report X-Y-Z classes as the means used for meeting the differences in abilities among children of the same grade. In some cases, the X-Y-Z classes probably differ but little from the type of classes classified under the caption, homogeneous grouping, but the use of the name "X-Y-Z classes" furnishes a criterion by which it may be judged that there is a more definite organization and system of provision than is indicated by the terms

"ability grouping" and "homogeneous grouping." In 8 cities, pupils in the X-section are sometimes given extra promotions in order that they may be kept working with those of approximately the same ability and achievement. "Coaching teachers," as well as X-Y-Z classes, are provided for the gifted by 3 cities. Whether these teachers work with both bright and dull or with the bright only is not mentioned.

Besides ability grouping by the X-Y-Z plan, 15 cities report special classes for the gifted in their school systems. These classes are used in 11 other cities as the only means of provision for the gifted children in the schools. In some cities, the object of these classes is to allow pupils to complete the same amount of work as others, but in less time, while in others special curricula are provided. Some of the large cities have only one or two such classes, while others attempt to provide this opportunity for all their bright children.

Within the category, "special classes," have been placed the cities which report special classes together with such plans as the use of unassigned teachers in certain grades, a so-called "three-track" plan, combinations of X-Y-Z grouping, special classes and extra promotions, and the like. Winnetka, Illinois, which has individual instruction, has been placed in this category. Although it fits but little better here than in any of the others, it is the only city reporting such provision.

For a questionnaire designed to discover what is being done for the gifted, this one elicited a remarkably large amount of information concerning what is being done for the subnormal! Probably this fact is a sign that a beginning is being made in the attempt to cope with the problems arising from individual differences. Because dull children do not get along well in school and demand much of the teacher's attention, they are provided for first. The epitome of the attitude toward the gifted, as contrasted with that toward provision for the dull, is rather well expressed in this quotation from one of the questionnaires:

> We have speed classes for the gifted which do the work of three years in two. The classes are formed in the seventh grade and pupils go directly into senior high school from them. There is no scientific method of selecting them—only their work and apparent abilities. . . . . We maintain an opportunity room for subnormal children. *Pupils in this class are selected by our psychologist only after careful and exact scientific testing.*[5]

[5] The italics were inserted by the present writer.

While many school systems have passed beyond this attitude, we find that sometimes, even now, especially trained and highly paid teachers have been obtained for the dull, because of the mistaken idea that thereby wonders in learning may be accomplished (5). On the other hand, poorly trained teachers have sometimes been put in charge of bright children, because it was felt that they would get along well without much teaching. This sort of thing has been mentioned by Eliot, Hartwell (2), Woolfolk (9), Aley (1),

TABLE I

DISTRIBUTION BY POPULATION OF CITIES REPLYING TO THE QUESTIONNAIRE

Categories	Cities Having Population of:						Total Number of Cities
	Less than 20,000	20,000–49,999	50,000–99,999	100,000–499,999	500,000–1,000,000	More than 1,000,000	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. No provision....	2	24	10	9	2	0	47
2. Provision by promotion, enrichment, etc.....	5	34	8	6	0	1	54
3. Homogeneous grouping, promotion by subject.....	7	18	12	5	1	0	43
4. X-Y-Z classes...	5	13	4	8	1	0	31
5. Special classes...	6	18	6	11	2	2	45
Total.....	25	107	40	39	6	3	220

Hehir (3), Kolbe (4), and others, who see our neglect of gifted children as a waste of great talent. Though we may attempt to give the subnormal the best of training, we cannot expect that they will do much more for society than obey its laws and perform simple routine tasks. No one can predict what may be accomplished by special training for the gifted, who usually have to get along as best they can. Witmer sounded the needed caution, when he said, "The old fable of the hare and the tortoise should not persuade the educational administrators of this country to stake *all* the public money on the success of the tortoise!" (7)

In Table I the number of cities in the various population groups is tabulated according to the type of provision made for the gifted. It is interesting to note that among cities having a population of more than twenty thousand, generally, the larger the city, the more specialized the provision for the gifted. This is to be expected, since usually the larger the city, the greater will be the amount of

funds available for educational experimentation. However, some smaller cities have specialized provision.

It will be recalled that approximately 53 percent of the superintendents replied to the questionnaire. The problem at once arises as to whether or not the replies represent a fair sampling of actual conditions. If there had been sufficient time, it would have been desirable to attempt to obtain a larger percent of replies, so that significant tendencies, if there are such, might have been observed.

TABLE II

PROVISION FOR GIFTED CHILDREN IN VARIOUS DISTRICTS OF THE UNITED STATES

	New England	North Central	Total		South Atlantic and South Central	Mountain	Pacific	Total	
			Number	Percent				Number	Percent
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Provision by promotion, enrichment, etc.	22	20	42	26	9	2	1	12	21
Homogeneous grouping, promotion by subject, etc.	11	17	28	17	6	4	5	15	26
X-Y-Z classes	5	21	26	15	4	....	1	15	9
Special classes	15	15	30	18	9	....	6	15	26
Cities making some provision for the gifted	53	73	126	77	28	6	13	47	82
Cities making no provision	25	12	37	23	7	1	2	10	18
Cities replying to questionnaire	78	85	163	52	35	7	15	57	48
Cities to which questionnaires were sent	150	144	294	71	75	15	29	119	29

A priori, it seems probable that the cities which did not reply would fall mainly into the first two groups, namely, those reporting no provision whatever, or those allowing extra promotions. The cities which have developed rather specialized means of provision for the gifted would be expected to show enough interest in the problem to reply to a brief questionnaire, such as the one distributed by the writer. It is probably safe to assume that practically all provision for gifted children in cities having a population of twenty thousand and more is here reported.

Because the cities replying to the questionnaire were located in all parts of the country, and there seemed to be no selective geographical factor operating to cause a greater percent of replies from one part of the country than from another, it was found feasible to treat the data according to geographical distribution of cities. The United States census classification of states was used. Table II shows this treatment. Too much significance should not be attached to the finding that the northern and central states have more special classes and more specialized types of provision for the gifted than have the southern and western states, partly because the returns from the questionnaire were incomplete, and partly because there are more special classes in districts of dense population, as shown by Table I.

In 1911, Whipple reported four special classes for gifted children (6). Other questionnaire studies, which have appeared, from time to time, have shown varying numbers of special classes, but none of them so many as the 45 here reported. While the formation of these classes has been almost altogether a development of the twentieth century, they have had a rather steady growth, and the indications are that we shall continue finding more and more of them in the schools of this country. The data here presented have shown that they are not now confined to large cities, as they were at first. The obvious conclusion is that they are proving to be the best method of providing for the gifted children in our schools. Since the sentiment favoring such provision is growing, probably we shall see more of these classes formed each year, a continuation of the tendency of the past fifteen years.

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EDITORIALS

KISS NATURE GOOD-BYE

GREAT excitement and feverish activity prevail among educational psychologists! Why? Because one more milestone has been passed; because the age-old perplexity of heredity has been banished, the old riddle of nature versus nurture has been solved. But solved, it must be admitted, in so unexpected a manner as to spread consternation among those less up-to-date psychologists who did not have their ears to the ground and their eyes open to what was coming. However, they are doing their best to make a snappy adjustment to the new order of things. Our fellow associate-editor, Terman, is giving back to the Commonwealth Fund (for fear of prosecution on the charge of obtaining money under false pretences) what he has spent on investigating the ancestry of gifted children; Professor Thorndike has withdrawn from sale his *Original Nature of Man;* the doors of the Eugenics Laboratory in London have been padlocked; the Board of Directors of the National Society for the Study of Education has voted to delete the words "and Limitations" from the title of its Yearbook "Committee on the Possibilities and Limitations of Training," while Dr. Goddard, by taking the black spots from every chart, has been able in three days to prepare for the press a reconstruction of his well-known book, which will shortly appear under the title "Kallikaks Recast."

We want our readers to keep up with the times, so we must explain that it is the behaviorists, aided by at least one anthropologist, that have effected this amazing revolution. Dr. George Dorsey, at any rate, according to the Boston *Herald,* told the Women's City club of that American Athens "that there are no inherited traits, characters, talents; that every normal person is born with the capacity to learn any behavior that man has ever known, and that a body organization can be built up in the first five years of life which makes it impossible for the person to kill or steal."

It is these last clauses from the author of *Why We Behave Like Human Beings* that may make the cannier of the pedagogical tribe think twice or thrice before climbing aboard this latest band-

wagon: "Rather a tough lot of responsibility for us to shoulder," they say, "and rather a severe jolt to our professional pride—here we ought to have been turning out a world of geniuses—and just look at 'em!"

Well, we have performed our duty, more or less, gentle reader, by telling you what is going on, what is *le dernier cri* in educational psychology. If you want to be among the elect, you would do well to kiss Nature goodbye—unless, of course, you may think that, to translate our French this time, "It is to laugh."

G. M. W.

PAUL RAYMOND STEVENSON

1885-1927

It is with deep sorrow that we announce the death on January 14 of Dr. Paul R. Stevenson, vice-president of the Educational Research Association, Professor of Education and Research Associate in the Bureau of Educational Research at Ohio State University.

Dr. Stevenson was well known throughout the country for his research activities. In addition to the many magazine articles he had written, he was the author of three monographs, *Larger Classes or Smaller,* published by the Public School Publishing Company, *Class-Size in the Elementary School* and *Campaign Publicity for Schools,* published by the Ohio State University Press. His interest and activity in the field of measurements were extensive and varied as is evidenced by the following publications: Problem Analysis Test; Buckingham-Stevenson Information-Problems Test in Geography; Buckingham-Stevenson Place Geography Test; Stevenson-Coxe Latin Derivative Test, Latin Vocabulary Test; and a series of intelligence tests now on the press.

Dr. Stevenson rendered unusual service to the school people of Ohio through the surveys which he conducted and through the work in school publicity which he organized. The success of many campaigns for extra levies and school bonds was due to the assistance he rendered to the superintendents and school boards.

E. J. A.

NEWS and COMMUNICATIONS

Dr. H. T. Manuel, who has been at the Colorado State Normal School, Gunnison, Colorado, for several years, accepted an appointment to the staff of the University of Texas the first of the current year.

At a recent meeting of the Board of Trustees of Teachers College, Columbia University, a gift of $100,000 by Mrs. Richard M. Hoe was announced. This gift will endow a professorship in education as a memorial to her husband, who was a member of the Board of Trustees of that institution for several years.

Arthur Williams, vice-president of the Commercial Relations section of the New York Edison Company, in an editorial in the *Annual* of the Academy of Political Science in New York, advocated the complete nation-wide electrification of the rural districts as the permanent solution of the national farm problem.

The University of North Carolina Record published, under date of July 1, 1926, an annotated bibliography of "Research in Progress, July, 1925-July, 1926." It would seem that such a publication issued by each of our universities would be of very great value to members of graduate schools everywhere.

The September *Research Bulletin* of the National Education Association presents in a most striking manner, the difference between the public school of forty years ago and the public school of today. Enrollment, length of term, days attended, salary and training of teachers, subjects taught, and the purpose of education then and now, are contrasted.

The principals' teaching load as reported on a questionnaire returned by eighty-two superintendents in schools of various sizes in the United States is reported in *The Fifth Yearbook* of the Department of Elementary-School Principals of the National Education Association, chapter v. The results of the study indicate that "there is no policy at the present time among the administrators relative to the teaching load of elementary-school principals."

The A. M. Palmer Company (Palmer Penmanship) has recently circulated a bulletin on print-writing. The bulletin contains a letter from Dr. Bridges, superintendent of schools at Hillsford, England, in which he states that print-

writing, or the script system—as it is known in England—rose to great popularity just previous to the war, but is distinctly on the wane at the present time.

"Concerning Parents" was the general theme of a conference in Baltimore on November 30 and December 1, 1926, which was sponsored by the Child's Study Association of America. Newer ways with children, mental hygiene, the educational approach, were among the major topics considered by leaders in this field.

The Bureau of Collegiate Educational Research of Columbia College, Columbia University, of which Dr. Ben D. Wood is director, announces a series of tests for high schools and colleges published by the World Book Company. The present series includes tests in English, French, German, Spanish, plane geometry, and civics.

The Honorable Charles Evans Hughes has been elected president of the American Association for Medical Progress to succeed the late Charles W. Eliot. The purpose of this Association is to encourage experimental research for the advancement of medical science, and to inform the public concerning the methods and discoveries responsible for man's increasing control over animal and human diseases.

The American Social Hygiene Association, in cooperation with committees on social hygiene in 202 universities and colleges, has developed a tentative outline of material for sex-character education. The assumption is that this work will be carried on in courses in education and educational psychology. Suggestions are given for the possible integration of material in biology, in educational psychology and sociology, and in educational principles.

Superintendent Harris, of Pontiac, Michigan, sent in the program of the Section of Superintendents of Schools of Cities with a Population from Ten Thousand to One Hundred Thousand, Tuesday afternoon, March 1, 1927, with the request that it appear in this issue of the JOURNAL OF EDUCATIONAL RESEARCH.

GENERAL TOPIC: Problems of School Administration and Their Solution

Chairman: JAMES H. HARRIS, *Superintendent of Schools, Pontiac, Michigan*

1. "The Problem of the Selection of Textbooks," Frank A. Jensen, *Superintendent of Schools, Rockford, Illinois*
2. "Problems of Educational Supervision: Superintendents, Supervisors, and Principals in Their Relation to the Problem and to One Another," W. C. McGinnis, *Superintendent of Schools, Revere, Massachusetts*
3. "The Administration of the Industrial and Vocational Work of the Schools," Walter H. Bachrodt, *Superintendent of Schools, San Jose, California*
4. "The Philosophy and Administration of the Winnetka Plan of Individual Instruction," Carleton W. Washburne, *Superintendent of Schools, Winnetka, Illinois*

   "The Philosophy and Administration of the Dalton Plan," Miss Helen Parkhurst, *Children's University School, New York City*

   "An Administrative Appraisal of Programs of Individual Instruction," Dr. E. E. Lewis, *Professor of School Administration, Ohio State University*

General Discussion

The Harmon Foundation of New York, through *The Survey*, offered three prizes for the best unpublished manuscripts dealing with some adventure or accomplishment in the field of public education, submitted to the jury before December 31. President Glenn Frank, of the University of Wisconsin, heads the list of judges. John H. Findley, former commissioner of New York, and Will C. Wood, state superintendent of California, are perhaps best known among the other members of the jury.

We are happy to spread the news that the electorate of California by a big majority approved an amendment to the State Constitution which designates that corporation taxes shall be spent in part for buildings of the state university. Six million, of the eight and one-half million dollars involved, are to be divided equally between buildings at Berkeley and Los Angeles. The remaining two and one-half millions are to be expended for state office buildings at Sacramento and Los Angeles.

Professor W. J. Chase, of the Department of Education, University of Wisconsin, has translated the *Ars Minor* of Donatus. This Latin grammar is the ancestor of modern grammars in many languages, but this is said to be the first time it has been translated into English. It was the most commonly used grammar between 400 and 1500 A.D., and was so important that it was among the first books printed when the art of printing was invented in the fifteenth century.

Joy E. Morgan, editor of the *Journal of the National Education Association*, in the November issue of *Child Welfare Magazine* pointed out that teachers form the largest public-service group in modern society. He also stated that "no child can afford not to consider its possibilities as a career. No vocational counselor can afford to ignore it. No wise parent will overlook its enduring values. No genuine master of statecraft will fail to see the need for attracting into teaching the best minds and hearts of every generation." We wonder whether school teachers have sufficiently recognized these facts and made them as apparent to their students as they should.

The educational division of the Pan-American Union, in a report of the activities covering the year 1925-26, tells of a large number of inquiries from Latin-American countries relative to nearly every phase of education in this country. The Union publishes an article each month on some phase of educational progress in the United States in both the Spanish and Portuguese editions of the *Pan-American Bulletin*. American teachers and students also utilize the services of the division in obtaining information about Latin-America.

An inquiry concerning summer-session advertising, sent to a number of universities and state teachers' colleges in the Middle West by the Bureau of Educational Research, Ohio State University, revealed some interesting facts. About one-third of the schools distribute posters or large lithographed sheets; two-thirds distribute circular letters or printed matter of the small folder type; three-fourths advertise in educational publications; two-thirds

use other forms of advertising such as news stories and preliminary announcements. The amount of money spent for advertising varies from nothing to about five thousand dollars, and the median is, apparently, about five hundred dollars.

Dean Russell, in his report of the past year's work at Teachers College, Columbia University, pointed out that there is no provision in the teaching profession for apprentice training under the eye of the master such as is true in a law office or a hospital. He states that "educational procedure lags far behind the needs of the present, to say nothing of what the future will demand, largely because it accepts the dictum that what has been, will be, despite the visions of reformers."

The Orleans-Solomon Latin Prognosis Test intended for high schools and colleges has recently been issued by the World Book Company. The test is revised upon the theory that ability to discriminate differences and apply that which is learned in a similar situation is highly correlated with ability to learn Latin. It is said to correlate with achievement at the end of the first half-year better than 0.80. There are seven pages of test material which can be administered to the group in about fifty minutes.

A mimeographed bulletin containing the results of tests in junior high-school spelling and a discussion of the relative achievements of 40- and 60-minute study periods was issued recently by the Department of Research of the Public Schools of Kalamazoo, Michigan. It is Number 39 of the research series. The spelling tests were selected from the Ayres-Buckingham scale, the words being embedded in dictation material. The results showed all grades below the Ayres standard which is probably to be expected since the test was given at the beginning of the year. It also showed that where grades were divided into X, Y, and Z divisions, the results were progressively poorer from the X to the Z division. The study of the 60-minute versus the 40-minute period seems to end with no significant difference in favor of either form of organization.

How to Make Courses of Study in the Social Studies is the title of a recent bulletin by M. E. Herriott from the Bureau of Educational Research of the University of Illinois. The bulletin discusses tendencies in the social studies, function and plan of courses of study, and content of courses of study in the social studies. There is also a selected and an annotated bibliography. Under content of courses of study the author suggests objectives both ultimate and immediate, material aids to instruction, provisions for individual differences, suggestions relative to instruction, adaptation of teaching procedures to individual differences, and references for the teacher. It would seem that in accordance with the best courses of study being constructed at the present time, the fourth item should have been discussed. In addition to objectives, material, and a method for reaching these objectives, there should be suggestions on how to know when the objectives have been reached; in other words, something re-

garding standards of attainment and means of checking the extent to which our material and method has accomplished its object.

DIAGNOSIS IN ARITHMETIC

Systematic remedial work can be directed from the study of regular drill work in arithmetic, under proper conditions. Most of us are too busy to give special tests in arithmetic with sufficient frequency to guide us in a perpetual remedial program, and, therefore, we have to get our diagnosis from our regular drill work. The following paragraphs suggest a method of locating breakdowns in a process before such breakdowns become chronic.

A sixth-grade class in arithmetic was given a series of mixed fundamental drills, two each week. The purpose of these is to maintain skill in previously learned processes. The use of drill material at regular intervals needs no defense for those who are acquainted with schoolroom situations. After each drill the teacher made a record of the number of pupils who had missed each problem in that particular drill. Problems missed by more than half the class were starred. A sample drill follows, and a sample weekly record is given in Table I.

DRILL NO. I

1. Subtract:
94327
65234

2.
437
602
591
832
475

3.
4/5 x 2/3

4.
.06
5.01
.23
2.96
5.72

5. Multiply:
432
67

6.
3/7 ÷ 9/14

7.
37)2405

8.
18)2004

9.
7528
x269

10.
6104
x3724

11.
3 1/4 — 2 2/3

12.
7/18 of 5

13.
4 1/2
2 2/3
17 5/6
9 3/4

14.
5/24 ÷ 5/8

15.
82)1435

TABLE I

TEACHERS' DIAGNOSTIC RECORD, DRILL 1

Problem No.	Pupils Solving	Problem No.	Pupils Solving
(1)	(2)	(3)	(4)
1	25	10	26
2	28	11	23
3	9[a]	12	6[c]
4	18	13	24
5	24	14	10[d]
6	17	15	24
7	12[b]		
8	17	Sum	291
9	28	Pupils in class	28
		Average	10.4

[a] Multiplication of fractions
[b] Division
[c] Multiplication of fractions
[d] Addition of fractions

There were on the average about three problems starred in each drill. After sixteen drills had been given, the results were summarized to determine the points of breakdown. Table II indicates the different types of problems, how many of each type occurred in these sixteen drills, and how many were starred. An examination of Table II shows clearly that many failures occurred in multiplication of fractions. Eleven of the 27 examples in this process were starred. The next serious difficulty is presented by multiplication of decimals. There was also trouble in the addition of fractions and in the division of decimals. In actual percent of problems missed, there would seem to be more

TABLE II

NUMBER OF PROBLEMS OF EACH

Process	Number Occurring	Number Starred
Addition	18	0
Subtraction	16	0
Multiplication	26	1
Division	31	5
Addition of fractions	25	5
Subtraction of fractions	23	2
Multiplication of fractions	27	11
Division of fractions	23	2
Addition of decimals	12	0
Subtraction of decimals	18	1
Multiplication of decimals	24	8
Division of decimals	16	4
Addition of denominate numbers	2	0
Subtraction of denominate numbers	4	2
Multiplication of denominate numbers	5	2
Division of denominate numbers	4	1

serious breakdowns in denominate numbers. The number of this type of problems, however, occurring in these 16 drills is so small that it would hardly be justifiable to assume it.

Remedial procedure can now be guided by Table II. Work will first be given in multiplication of fractions. When this skill has been rebuilt, work will be given in multiplication of decimals. Thus as many skills will be taken care of as time permits. While it is true that every error indicates a weakness, the time is limited, and remedial work must be applied where it is most necessary. The table shown leaves little doubt as to where this point is.

It should be noted that these drills are still being given, at present at the rate of one each week, and the table shown above can thus be made cumulative. A later summary may show a breakdown at some other point. Remedial work will always proceed in the light of the latest available information.

H. E. BENZ

University of Iowa

REVIEWS

Psychologies of 1925. Powell Lectures in Psychological Theory. Clark University, Worcester, Massachusetts, 1926. 412 pp.

This book consists of nineteen lectures by seven American and two German psychologists. In the order of appearance they are: J. B. Watson, W. S. Hunter, R. S. Woodworth, Kurt Koffka, Wolfgang Koehler, Morton Prince, William McDougall, Knight Dunlap, and Madison Bentley. These men were selected as representative of the leading contemporary points of view; their lectures to give an introduction to the "systems" of psychology known as behaviorism, *Gestalttheorie*, purposive psychology, dynamic psychology, reaction psychology, and the psychologies called "structural."

In the Preface the editor, Dr. Carl Murchison, claims that "we have here a genuine cross-section of contemporary theoretical psychology. Here are the norms with which future psychologies can be compared . . . . the principles which are up to date throughout the year 1925." These statements will be disputed by many readers, yet it is the opinion of the reviewer that at least twelve, and possibly fifteen, of the nineteen lectures can be read with considerable profit. The lectures of Hunter, Koehler, and Bentley particularly stand out as scholarly and dignified efforts.

Since "no one really understands himself until he understands his opponents," the book is printed to help others to a critical, but dispassionate, view of rival theories. As such it is to be commended, but in it there is much venting of spleen.

Two things the reader cannot escape: (1) All of the contributors, with the single exception of Dr. Prince, stand in agreement with Titchener who as early as 1921 wrote that "both *structural* and *functional* as qualifications in psychology are now obsolete terms." Bentley says that structuralism, whatever its contributions, "represents a closed chapter in psychological history. We take the past as it stands." (2) All of the lecturers, except the two behaviorists, are "down on" behaviorism. Whether all are agreed as to what behaviorism *is* is not revealed in their vituperations of it. The issue however is clear cut. Hunter states it well (p. 97) when he says "psychology (mentalism) is an indirect method of studying man; anthroponomy (behaviorism) is a direct method." The psychologist's problem is the inferential reconstruction of his subject's environment as it appears to the subject. The behaviorist's problem is the description of the behavior of man—the organism as a whole—in his environment. Dr. Hunter does not delimit the scope of the term behavior, nor does he deny the implication of an organism-environment dualism, which is just as inacceptable to some behaviorists as is a dualism of

mind and body. Yet Hunter's distinction of the split is to the point and should warn those who urge that any middle position, any compromise, or reconciliation is impossible between those who define psychology in terms of "experience" and those who define it in terms of "behavior."

Psychology thus seems to be passing through a transitional phase of history, and that is why this book should be given a careful reading by the readers of this Journal. It is regrettable that the publishers should be forced to charge six dollars for the book.

SAMUEL RENSHAW

Ohio State University

PILLSBURY, W. B. *Education as the Psychologist Sees It.* New York, Macmillan Company, 1925. ix + 342 pp.

Professor Pillsbury's latest contribution raises the following questions in the mind of the reviewer: Is psychology only, in contrast with education, justifiably called a science? Is the book a contribution to education or psychology? Is it a text in educational psychology instead of a treatise as named, that is, *Education as the Psychologist Sees It?* Is anything left to so-called pure psychology after the author has done justice to the educational discussion? Can one incorporate a large mass of the recently discovered behavioristic facts of educational psychology in the systematic enclosure of an older and more orthodox day? Are the psychological problems as faced and understood by the educator merely tacked-on applications through chapter-by-chapter discussions of the older type of psychological textbooks?

Professor Pillsbury maintains the same clear style and careful analysis shown by his earlier textbooks in psychology. The book will stand careful reading by teachers and by students of educational psychology, and it has certain value as an elementary text in that subject. The reviewer doubts that the book is as worthy a text in this subject as a number of the longer texts now on the market, such as Gates, or the new composite by Benson, Lough, Skinner, and West. Nor does he believe that it is so competent an analysis of psychology in relation to education as the recent work of Ogden or writers of the British school. The reviewer does think that it is a wholesome rewriting and abbreviation of the older and justly celebrated *Essentials of Psychology*, with a flavoring of educational psychology injected.

L. A. PECHSTEIN

University of Cincinnati

JONES, VERNON A. *Effect of Age and Experience on Tests of Intelligence.* New York, Teachers College, Columbia University, 1926. 74 pp. (Teachers College, Columbia University, Contributions to Education, No. 203)

This study is a contribution to the growing literature on the internal value of the subitems within mental tests. Jones set up, as a dual criterion for the effectiveness of subtests in a mental-test battery, an approach to unity for the

correlation between the score on the subtest and mental age independent of chronological age and a similar unit for the correlation between the score on the subtest and chronological age independent of mental age. These two considerations were combined into a single factor through the use of Kelley's coefficient of alienation, and correction was made for the influence of each subtest in determining the mental age.

The data, confined to Grades III to VII, are primarily concerned with Grade V. On the basis of his index used in conjunction with the median mental age derived from National Scales, A and B, Otis Advanced Examination, and Haggerty test, Delta 2, Jones ranked all the subtests. The five highest in order of excellence were information of the Haggerty test, Delta 2, No. 1; sentence completion of National scale, A, No. 2; information of National scale, B, No. 2; analogies of Otis test, No. 7; and logical selection of the National scale, A, No. 3. The five lowest in order of poorness were visual comparison of the National scale, B, No. 5; symbol-digit of National scale, A, No. 5; fundamentals of arithmetic of National scale, B, No. 1; picture completion of Haggerty test, No. 3; and arithmetic problems of National scale, A, No. 1.

Users of mental tests may note with interest the outcome of this study. Items comprising acquired information, often referred to in a derogatory sense as "mere" or "factual" information, appear to stand up best as a measure of "native brightness relatively free from the effects of mere living in the world and from the effects of environmental conditions."

GEORGE D. STODDARD

University of Iowa

ORLEANS, JACOB S. *A Study of the Nature of Difficulty.* New York, Teachers College, Columbia University, 1926. vi + 39 pp. (Teachers College, Columbia University, Contributions to Education, No. 206)

This little volume attempts an analysis of the factors which cause difficulty in test elements. Difficulty is defined by the author as "the extent to which groups are able to make the correct response to the situation." The material consisted of data regarding elements in the Pintner Non-Language Scale, the Thorndike Non-Verbal Test, Wiley Opposites Test, and Trabue Completion Test obtained in connection with other investigations. Results were tabulated by items being grouped according to age, grade, and mental age. The items were rated by five judges as to complexity, abstractness, obviousness, elaborateness, symbolicness, familiarity, and intrinsic interest. These ratings, except that for interest, when checked—two against three—were found to be fairly reliable.

The question then was to determine the relation of the characteristics just mentioned, as thus judged, to difficulty. The findings may be briefly summarized by saying that complexity, obviousness, and familiarity correlated, in general, most highly with difficulty, (about 0.60); elaborateness and symbolicness, approximately 0.25, while abstractness and intrinsic interest seemed to have no correlation with difficulty. For adults, obviousness and familiarity were most important; and for subnormal children, complexity.

One may question the adequacy of subjective judgment in such analysis, for it would be conceivably possible to vary the complexity of an item or other characteristic and keep the situation much more objective. A more extensive development of the possible implications of the findings would also seem to have been desirable, for, if difficulty is conditioned, as the author indicated, then the soundness of the conventional "scaling" of items in test-building may be questioned. The monograph is certainly correct in expressing surprise that the difficulty concept has received so little critical consideration, although the historical review of previous literature given by the monograph is by no means complete.

S. L. PRESSEY

Ohio State University

HERRICK, C. JUDSON, ***Brains of Rats and Men.*** Chicago, University of Chicago Press, 1926. xiii + 382 pp.

In the Preface is stated very definitely the purpose of the volume, namely, the justification of mind or consciousness as an integral part of the human organism. Let us quote Herrick's own words:

> The belief that mind or consciousness as introspectively experienced is a natural phenomenon which cannot be neglected in a total view of human behavior demands that this phenomenon be examined by the usual method of natural science and articulated in some organic way with the vital processes in their entirety.

The author, after telling us in his introductory chapter that we have brains because there is a natural determinism throughout "along the lines of progressively more of the mental type of efficiency," devotes the next seven chapters and chapters XII, XIII, and XIV to a comparative, developmental treatment of the important divisions and functions of the nervous system, including the cerebral cortex, corpus striatum, thalamus, and association centers. Such a limited space cannot give an exhaustive phylogenetic treatment of such topics, but to one with limited time and a reasonable knowledge of neurology it affords a valuable perspective.

Chapters IX through XI give a thorough discussion of the neural mechanisms involved in learning in rats, with numerous references to contemporary investigators. The experiments of Lashley are particularly criticized, both positively and negatively. Herrick cannot agree with Lashley that there is no localization in the cerebral cortex, as the latter's experiments seemed to prove, but feels that the type of animal and behavior investigated may simply show that in rats the cortex is unnecessary for learning that particular performance. The phasic influence of the cortex, according to Herrick, plays a much more important rôle as one goes up the scale; the chief effect of a rat's cortex is tonic.

The first fourteen chapters give a substantial neural picture to support the arguments in the last five, wherein the writer contends that consciousness is a vital, not an epiphenomenal, factor in the life of man, which is related to his

nervous make-up in the same way as contractility to a muscle. Men are not rats to the same degree that their nervous systems are not those of rats. To any one, whether he is neurologist or not, the perusal of these last five chapters would give a concise, clear picture of that side of the question.

A. SOPHIE ROGERS

Ohio State University

PRESSEY, SIDNEY L., AND PRESSEY, LUELLA COLE. *Mental Abnormality and Deficiency.* New York, Macmillan Company, 1926. xii + 356 pp.

This volume is an outgrowth of the authors' experience in teaching college courses in abnormal psychology and their case work with abnormal and defective individuals at the Boston Psychopathic Hospital. The subtitle describes it as "an introduction to the study of problems of mental health." The book is in three principal parts devoted to methods of case study, types of mental disease and disability, and methods of dealing with the major problems of abnormal mentality. There is a fairly representative bibliography of books and journals, a helpful glossary of technical terms, and an excellent index.

As a textbook this volume is useful in bringing together five major topics usually treated separately in spite of their natural correlation, namely history-taking, some of the specific mental disorders, feeble-mindedness, mental hygiene, and normal development and adjustment. All these topics are treated with reference to mental diagnosis. The treatment is both general and specific and shows a happy combination of wide reading correlated with practical experience.

A critical evaluation of the specific chapters leads the reviewer into too much variety of detail. In general, we may say, however, that the treatment is not so classical, so adequate, or so accurate as one desires in a textbook. Here and there personal prejudices are evident which are a little difficult to distinguish from originality of point of view. Perhaps the most important single new contribution is the emphasis on the need for better standards of "normal" development and adjustment, which constitutes a rebuke to current standards in clinical psychiatry and psychology and should encourage further research in those fields.

The outline of systematic case study impresses one favorably, emphasizing as it does some important features not usually included in published reports. Practicing clinicians will do well to emulate the authors' skill in abstracting case studies. The numerous case histories cited throughout the volume are both interesting and instructive and should prove valuable to students unfamiliar with mental diagnosis.

On the whole, this book will prove valuable as a text for students beginning the study of mental abnormalities. Its breadth of scope, case method of presentation, and freshening of traditional points of view, more than offset its technical shortcomings.

EDGAR A. DOLL

The Training School at Vineland, New Jersey

WOOLLEY, HELEN THOMPSON. *An Experimental Study of Children.* New York, Macmillan Company, 1926. xiii + 762 pp.

This is an account of an extensive series of physical and mental tests carried out by the author with the staff of the Vocation Bureau of Cincinnati, while she was Director of the Bureau. The test results were obtained from 753 native-born white children between the ages of fourteen and fifteen who were leaving school to go to work, and from over nine hundred other children of the same age and grade distribution who remained in school, the "school children" serving as a control group in the study of the "working children." Each child was brought back as far as possible annually for re-examination up to his eighteenth year. The physical tests included weight and vital capacity. The mental tests included association and memory tests, sentence completion, puzzles, and the Yerkes-Bridges Point Scale. Distributions of scores and percentile tables are given for each test separately for boys and girls of each group at each age. The statistical treatment is excellent, and these tabulations will prove useful to anyone examining adolescent boys and girls for guidance in public schools, in juvenile court, or in other clinical procedure.

The industrial conditions of the working children were studied together with some report on the social status of their families and on home conditions. Reports on length of periods of employment, wages, and kinds of industry are included. Valuable summaries appear at the end of each chapter with an interpretation of findings, in comparison of the working children with the school children and in comparison of the two sexes.

Dr. Woolley's closing chapter is written from the standpoint of the date of publication rather than the earlier date of completion of the testing series. It is a thoughtful discussion of the problem of elimination in relation to school work, to wages, to scholarships for superior children who would leave school if these were not provided, and to the function of vocational courses in the elementary school and the junior high school.

FRANCIS N. MAXFIELD

Ohio State University

REAVIS, WILLIAM CLAUDE. *Pupil Adjustment.* New York, D. C. Heath and Company, 1926. xviii + 348 pp.

Again and again as one reads along in the literature dealing with our modern high school, one finds references to the need for some kind of policy and an adequate administrative machinery for making the school reach the individual. With the great increase in the high-school population—about 1500 percent since 1890—we have "tapped lower social, economic, and mental pupils levels," we are told. Looking at it from the other side, the high school has, since 1890, become a very complex institution in organization, in curricular offerings, and in teaching techniques; so that even those with the best of social experience, fine economic opportunities, and much-above-normal intelligence will have difficulty in finding themselves unaided in the educational pell-mell.

This book, dealing in Part I with the general problems of pupil adjustment and in Part II with illustrative cases, is a valuable guide for the secondary administrative officer who feels himself responsible for lessening pupil maladjustment, failure, and consequent elimination, and for keeping the road of educational opportunity open to all. The problem of pupil adjustment as here conceived is more than mere vocational direction. It involves the discovery of the educational status of each pupil, ascertaining alike his strengths and weaknesses, diagnosing the causes of both failure and success, offering counsel and guidance, and, if need be, long-continued educational treatment, with a critical evaluation of the results.

The case method, already popular and successful in medicine, social work, and pathology is here recommended as the basis for the complete individual record of such data as age, intelligence, temperament, health, moral character, associates, amusements, educational achievement, vocational biases, and home and neighborhood conditions. The scheme for getting and using an initial appraisal through a battery of twenty-two simple tests, as used in the University of Chicago High School, is adequately discussed and illustrated. Further means of securing information through weekly, mid-semester, and semester reports of progress, together with special reports of maladjustment, are also illustrated.

So much for Part I and the general treatment of the problems of pupil adjustment through the case method. Part II gives illustrative cases of (1) social maladjustment, (2) physical and health disability, (3) endocrine deficiency, (4) unfavorable mental predilection, (5) deficient previous school training, (6) speech disability and emotional complication, (7) personality maladjustment, (8) ineffective habits of work and study, and (9) psychophysical defects.

While the book exaggerates some aspects of individual case work in educational adjustment and gives too much emphasis particularly to the probable validity of the outcomes of the Downey Will-Temperament Tests, it is, nevertheless, worthy of a prominent place in the "working library" of the modern superintendent and principal. For that matter, the classroom teacher will profit from a careful reading of it. The problems of the administrative officer in constructive student-accounting are such that there must always be a sympathetic and whole-hearted cooperation on the part of the entire teaching corps. No other single book will do more to give the faculty an appreciation of the "inside problems" of pupil adjustment.

OSCAR F. WEBER

University of Illinois

LOOMIS, ARTHUR KIRKWOOD. *The Technique of Estimating School Equipment Costs.* New York, Teachers College, Columbia University, 1926. vi + 112 pp. (Teachers College, Columbia University, Contributions to Education, No. 208)

In spite of the fact that a considerable percent of the annual school budget of the typical community is spent for school equipment, and in spite of the

fact that the efficiency of the school is partly dependent upon it, the problem of equipment has been given only casual attention in our educational literature. It is with thanksgiving, therefore, that one proceeds to examine a whole book on one important aspect of the problem.

The book in question—I suspect that it is a Doctor's dissertation—essays "to describe the technique of estimating school equipment costs." The author suggests that such technique is especially needed when the budget for equipping a school-building is being arranged.

Briefly stated, the book proposes an index-number technique for making the estimates of equipment cost. This index number is to be used in measuring price levels for school equipment from year to year. Categorically stated, the three steps in preparing estimates by this method are: "(1) determining the cost at 1925 prices; (2) measuring the change in price level from 1925 to the given year; (3) correcting the estimate based on 1925 prices in order to determine the cost at given-year prices."

Many attempts have been made recently to derive formulas that could be used in solving problems in school administration. I have yet to find one that can be applied to the individual situation. The formulas suggested for estimating equipment costs are even more impractical than most of the formulas that have been proposed.

When a community has need for estimating the equipment costs of a school-building, let it use the common-sense method of deciding first of all what kind and what quality of equipment it wishes; when this has been done, there remains only to find the best prices on the equipment. The use of any other technique is far-fetched.

Outside of this fundamental fallacy, I find nothing but commendation for the book. Dr. Loomis does a real service in "showing up" the "lump sum" method of estimating school costs, and in pointing out the necessity for the estimating of equipment costs with greater care. His 1925 prices on several hundred of the more common items of school furniture and equipment ought to be of interest.

All in all, the author has done a worth-while piece of work. It is hoped that the study is the forerunner of other studies in the field of school equipment.

WARD G. REEDER

Ohio State University

TAYLOR, R. B. *Principles of School Supply Management.* New York, Teachers College, Columbia University, 1926. vii + 145 pp. (Teachers College, Columbia University, Contributions to Education, No. 228)

Superintendents and assistant superintendents in charge of the business affairs of schools, as well as others who are responsible for the purchase, storage, and distribution of school supplies will find practical suggestions in Dr. Taylor's book. According to the author, school supplies, when contrasted with equipment, constitute (1) materials consumed or destroyed when used; (2) materials, the normal life of which, when in use, is not more than two years; and (3)

fragile articles frequently broken with customary usage and small articles frequently lost under similar circumstances. A functional classification of all major items of supply is attempted, which should have been done in much more detail if the maximum of usefulness was the ideal.

Recommendations made are based upon an analysis of supply management in sixteen cities of from fifteen thousand to one hundred thirty thousand population and an analysis of supply management in fourteen large institutions somewhat analogous to public-school systems. The following were some of the business organizations studied: Corn Exchange Bank, Chatham and Phoenix Bank, the New York Life Insurance Company, Metropolitan Life Insurance Company, the American Express Company, Western Union, New York Central Railway, United Cigar Stores, and the New York Post-Office. The smallest corporation studied supplied fourteen branches, while the largest was responsible for the purchases and distribution of supplies for more than thirty thousand branch offices. Several representative jobbing houses, dealing in school supplies, were also visited, but little of value was learned from this source.

From among the fifty-one conclusions rendered, several have been chosen as representative. Practically all supplies should be purchased on a basis of competitive bids. *A supply department* should be created when the annual cost of supplies reaches approximately $25,000. The practice of distributing supplies from a central storeroom to the respective buildings each month, or "as needed" involves an excessive waste of time and energy. Business organizations in contrast to school systems are able to pay their bills in time to secure discounts.

A plan for the management of school supplies is proposed which involves a standardized supply list, an annual estimate of needs, and an annual budget of estimates for supplies. A scheme of accounting for supplies is suggested. Care in the apportionment of supplies and economy in their utilization are urged.

HARRY S. GANDERS

University of Cincinnati

FLEMING, CECILE WHITE. *A Detailed Analysis of Achievement in the High School.* New York, Teachers College, Columbia University, 1925. xi + 209 pp. (Teachers College, Columbia University, Contributions to Education, No. 196)

The purpose of this reported investigation can best be stated in the words of the author:

> This study is an attempt to obtain measures and estimates of various traits for junior and senior high-school pupils, to analyze them in relation to one another, and to evaluate them with reference to their significance for school achievement. It attempts to analyze high-school marks in terms of objective measures of mental ability, of achievement, and of personality, and on the basis of teachers' judgments of mental ability and character and physical traits.

The study is an effort to show the value which each of the several types of measure and rating has singly, and the contribution which it makes to a combined estimate of pupils' accomplishment in the high school; to show the significance of each of several test scores and ratings on the basis of (1) its individual correlation with a criterion of academic achievement, (2) its correlation with comparative subsidiary criteria, (3) its intercorrelations with the other instruments; to note its value when elements common to other scores are eliminated by partial correlation; and finally, (4) to determine its unique value in building up by multiple correlation a measure of pupil success.

The pupils used as subjects were 268 boys and 285 girls in the Horace Mann Junior and Senior High Schools. The data used were scores from three group mental tests, chronological age, objective achievement test scores, scores on an objective will-temperament test, teachers' estimates of mental ability and ten personality or character traits, a record of pupil participation in extra-curricular activities, and a record of achievement or scholarship as expressed in teachers' marks. The technique involved the use of coefficients of zero order, partial coefficients of first and second order, and multiple ratio coefficients combining, in the final results, as many as seven factors.

The literature bearing on the problem and techniques is carefully, thoroughly, and intelligently reviewed. Each step in the procedure is justified, or defended, while possible criticisms are anticipated and answered. The statistical treatment is thorough-going, and exemplifies the skill of a real technician. The language of presentation is necessarily specialized and technical, at times becoming so very meticulously precise as to appear labored and almost pedantic. Conclusions drawn from the results are well considered, not over-stated, and entirely defensible.

The study shows that there is a high degree of correlation between intelligence ratings and school success. Does that prove that the tests are valid as measures of intelligence, or does it prove that the tests are valid as measures of academic activities, or does it prove that school success is measured and estimated in terms of academic achievement, or what does it prove? Certainly this much is indicated, namely, that the schools increasingly select through the grades those students who can perform intelligence tests in keeping with the requirements of the group. That school success is identical with, or prophetic of, success in out-of-school or post-school activities is by no means certain. The real question which school men wish to have answered is not whether the group intelligence tests will select those who can perform successfully in school activities—they have satisfied themselves about that—but whether the ability, or trait, or capacity, or what-not, which the intelligence test measures, is the significant or prime factor in the determination of post-school success, or, whether some others of the factors are the essential ones. A study like this helps to clear away some of the debris and offers a trial route to the goal.

L. A. WILLIAMS

University of California

STRATEMEYER, FLORENCE B., AND BRUNER, HERBERT B. *Rating Elementary-School Courses of Study.* New York, Bureau of Publications, Teachers College, Columbia University, 1926. xiv + 193 pp.

In this, its first publication, the new Bureau of Curriculum Research of Teachers College has made a contribution of first-class importance and of such unmistakable value that one immediately conceives the highest hopes of the work which is to follow it. Dean Russell is right when he says in his Foreword that "the revision of school curricula is the most pressing problem in American education," and right also when he declares that the ideal of public education has become democratic and nationalistic instead of aristocratic and individualistic as it was in recent years. As swift a current of change has been running in this activity of American life as in every other, and means of keeping abreast of it are yet to be devised. No one can examine this volume without the conviction that in the Bureau of Curriculum Research one such means has been set up. It is to function as a coordinating agency of the most valuable kind. Each town, each county, and each state makes it own course of study. They are printed or mimeographed and sent to the local schools to be carried into effect with such success as may attend that effort, but seldom are they subjected to a comparative examination to determine their sufficiency. Teachers College collected nine thousand such live courses of study and organized a staff and outlined a plan of procedure to make a comparative study and evaluation of them. This book is the first fruits of that colossal enterprise. Only a high-powered and numerically resourceful organization could have undertaken so vast a work and only the most competent and exhaustively thorough direction could have carried it forward to the stage it has already reached—to say nothing of further developments which are already well in hand.

Making and evaluating courses of study is not in the nature of the case an exact science. Criteria for evaluating courses had to be set up. A consensus of the competent was invoked. First, 498 courses of study were rated by research students as to points of strength and of weakness. Second, a study was made of their ratings in which each point of strength and of weakness was tabulated and classified. It revealed that 886 points of strength and 827 points of weakness had been reported. A third step was to secure additional guidance in setting up criteria from standard references in each of the subject-matter fields, and a study was made of standards set up for measuring textbooks in the work of Spaulding, Maxwell, and others. Next, tentative criteria in each field of subject-matter were built up and critically reviewed by certain members of the faculty of Teachers College. The criteria were drafted in final form so as to include many diverse and opposing points of view.

The most interesting and profitable part of the book is that which outlines these criteria of judgment. Courses of study cannot well be made henceforth without consulting them and indeed, as I believe, embodying them. The results of their application to current courses are hardly less interesting.

ERNEST C. MOORE

The University of California, Southern Branch

CROSS, E. A. *Fundamentals in English.* New York, Macmillan Company, 1926. xiv + 525 pp.

This volume, devoted to "the teaching of grammar and those phases of English study that have to do with words and sentences," has two main divisions. Part I treats of the historical development of the English language and after some fifteen chapters, wherein Sanskrit roots, Agricola, Piers Plowman, Beowulf, Wyclif, Chaucer, otolaryngology, and eulogies of the six-column dictionary reverberate pleasantly enough, reaches a climax in the chapter entitled "Good English." Here the author falls back upon the customary pronouncement that "good English is the language of cultured people." He then attempts to define "cultured" and after some paragraphs emerges with the not particularly enlightening dictum that "a cultured man or woman is one who has good taste." Still beset with an uneasy and, in the circumstances, creditable sense of having failed to touch bottom, he quotes from three authorities who have fared no better than he, and so concludes the first section of his volume.

Part II opens with an edifying and not uninteresting chapter on the history of grammar as a school subject and then proceeds to devote a chapter or two to each of the parts of speech, to the sentence, to punctuation, to common errors, to "aims and practices," to the psychology of grammar teaching, and to "tests and devices for measuring the results of English teaching." Into these chapters it seems to me the author has, by and large, contrived to get a large amount of sound sense. He is, for example, sane about the use of the diagram, and though he gives the statistical *dhalma-lamas* somewhat more than their due, he does not accord them that agape and fatuous adulation with which they have come to expect the pedagogue to contemplate their egregious sorceries.

One notes with satisfaction that there is a great deal of material in the book which cannot possibly be of any "practical use" to the bucolic Minerva who aspires to teach the offspring of farmers and Lithuanians how to avoid the 25,376 errors discovered by Charters and his cohorts among the infantry of Pittsburg, Detroit, Boise, and Connorsville. Such a teacher will probably resent being told that we get the words *mammon* and *damask* from the *Aramaic*, that King Arthur was defeated at "dark Tintagil by the Cornish sea," and that Old English did not have relative pronouns, because she cannot see that the possession of such *arcana* will have any effect on her "professional advancement." Nevertheless, these things are mixed with many matters that do have the desired "practicality"; there is an imposing array of bibliographies and footnotes, and the book is for the most part written in that bald and sober style which inspires confidence among schoolmarms. Hence I am led to hope that many of them will be inveigled into reading it.

NOTLEY S. MADDOX

Ohio State University

PUBLICATIONS RECEIVED, NOVEMBER 15 TO DECEMBER 15

BOOKS FOR EDUCATIONAL EXECUTIVES

Blankenship, A. S. *The accessibility of rural schoolhouses in Texas.* New York, Teachers College, Columbia Univ., 1926. 62 pp. (Contributions to education, no. 229) Cloth, $1.50. Paper, $1.25.

Butterworth, J. E. *Principles of rural school administration.* New York, Macmillan, 1926. 379 pp. $1.60.

Chassee, L. J. *A study of student loans and their relation to higher educational finance.* New York, Harmon Foundation, n.d. 170 pp. (Harmon foundation monographs, no. 1) $1.00.

Clippinger, W. G. *Student relationships: an orientation course for college freshmen and high school seniors.* New York, Thomas Nelson & Sons, 1926. 145 pp. $1.50.

Columbia University. Teachers College. Institute of Educational Research. Division of Field Studies. *Report of the survey of the schools of Port Arthur, Texas.* New York, Teachers College, Columbia Univ., 1926. 333 pp. $1.50.

Fuller, R. G., and Strong, M. A. *Child labor in Massachusetts.* Boston, Mass., Child Labor Com., 1926. 170 pp. $1.00.

Ganders, H. S. *A system of school records and reports for smaller cities.* Greeley, Colo., Colorado State Teachers College, 1926. 191 pp. (Colorado teachers college education series, no. 1) $1.50.

Gove, F. S. *Religious education on public school time.* Cambridge, Mass., Harvard Univ. Press, 1926. 143 pp. (Harvard bulletins in education, no. 11) $1.00.

Jackson, G. L. *The development of state control of public instruction in Michigan.* Lansing, Mich., Michigan Historical Com., 1926. 381 pp.

Job, L. B. *Business management of institutional homes for children.* New York, Teachers College, Columbia Univ., 1926. 205 pp. (Contributions to education, no. 215) Cloth, $1.50. Paper, $1.25.

Peffer, Nathaniel. *New schools for older students.* New York, Macmillan, 1926. 250 pp. $2.50.

Reeder, W. G., and Paisley, E. A. *Trends of school costs in Ohio.* Columbus, Ohio, Ohio State Univ. Press, 1926. 34 pp. (Contributions in school administration, no. 3)

Saxman, E. J. *Students' use in leisure time of activities learned in physical education in state teachers colleges.* New York, Teachers College, Columbia Univ., 1926. 90 pp. (Contributions to education, no. 217) Cloth, $1.50. Paper, $1.25.

Van Wagenen, M. J. *Educational diagnosis and the measurement of school achievement.* New York, Macmillan, 1926. 276 pp. $3.00.

BOOKS FOR PSYCHOLOGISTS

Cox, C. M. *The early mental traits of three hundred geniuses.* Stanford University, Calif., Stanford Univ. Press, 1926. 842 pp. (Genetic studies of genius. Vol. 2) $5.00.

Hopkins, L. T. *The intelligence of continuation-school children in Massachusetts.* Cambridge, Mass., Harvard Univ. Press, 1924. 132 pp. (Harvard studies in education. Vol. 5) $1.75.

Perrin, F. A. C., and Klein, D. B. *Psychology, its methods and principles.* New York, Holt, 1926. 387 pp. $2.25.

BOOKS FOR TEACHERS AND SUPERVISORS

Blom, Sister M. C. *Educational supervision in our Catholic schools.* Washington, Catholic Univ. of America, 1926. 111 pp. $1.00.

Buckingham, B. R., and Osburn, W. J. *The Buckingham-Osburn searchlight arithmetics; introductory book.* Boston, Ginn, 1927. 381 pp. $1.00.

Curoe, P. R. V. *Principles of education.* New York, Globe Bk. Co., 1926. 138 pp. $1.20.

Day, M. S. *Scheubel as an algebraist.* New York, Teachers College, Columbia Univ., 1926. 168 pp. (Contributions to education, no. 219) Cloth, $1.50. Paper, $1.25.

Demiashkevich, M. J. *The activity school; new tendencies in educational method in western Europe.* New York, A. G. Seiler, 1926. 150 pp. $1.50.

Friese, J. F. *Exploring the manual arts.* New York, Century, 1926. 412 pp. $2.25.

Myers, A. F., and Beechel, E. E. *Manual of observation and participation.* New York, American Bk. Co., 1926. 263 pp. $1.32.

Osborn, H. F. *Evolution and religion in education.* New York, Scribner, 1926. 240 pp. $2.00.

Philadelphia. South Philadelphia High School for Girls. *Educating for responsibility; the Dalton laboratory plan in a secondary school.* Prepared by members of the faculty of the school. New York, Macmillan, 1926. 310 pp. $1.40.

Washburne, Carleton. *New schools in the old world.* New York, John Day Co., 1926. 174 pp. $1.75.

Whitcomb, C. T., and Beveridge, J. H. *Our health habits; a complete course in child hygiene for the grades.* Chicago, Rand McNally, 1926. 608 pp.

Willing, M. H. *Valid diagnosis in high school composition.* New York, Teachers College, Columbia Univ., 1926. 64 pp. (Contributions to education, no. 230) Cloth, $1.50. Paper, $1.25.

Wilson, G. M. *What arithmetic shall we teach?* Boston, Houghton Mifflin, 1926. 149 pp. $1.20.

Woolley, P. V. *A guide to woodworking projects.* Peoria, Ill., Manual Arts Press, 1926. 96 pp. $1.00.

Wright, G. H. *The 100 combinations in arithmetic, with suggestions and plans for learning.* Champaign, Ill., Johnson-Randolph Co., 1926. Unp.

BOOKS FOR HIGH-SCHOOL STUDENTS

Clark, T. F. *English classics completely analyzed.* New York, Noble & Noble, 1926. 511 pp. $2.00.

Ericson, E. E. *Glass and glazing.* Peoria, Ill., Manual Arts Press, 1926. 146 pp. $1.75.

Fay, C. R. *Elements of economics, a textbook for secondary schools.* New York, Macmillan, 1926. 631 pp. $1.68.

Finney, R. L. *General social science.* New York, Macmillan, 1926. 459 pp. $1.60.

Ford, Celia. *Second Latin book.* New York, Holt, 1926. 389 pp. $1.68.

Galland, J. S., and Brenes-Mesén, Roberto. *Elementary Spanish reader.* New York, Century, 1926. 227 pp. $1.25.

Guitteau, W. B., and Webster, H. H. *The constitution of the United States: its origin, meaning, and application.* Boston, Houghton Mifflin, 1926. 216 pp. $.82.

Hix, Melvin. *Fifty English classics briefly outlined.* New York, Noble & Noble, 1925. 300 pp. $2.00.

Hunt, De Witt. *Mechanical drawing.* Oklahoma City, Okla., Harlow Pub. Co., 1926. 184 pp. $1.50.

Jasinski, Max. *Contes de la vieille France.* New York, Macmillan, 1926. 198 pp. $.60.

Keats, John. *Poems.* Ed. by F. P. Bachman. New York, American Bk. Co., 1926. 112 pp. $.48.

Lamberton, C. D. *Library reading note book.* Berlin, Wis., Lamberton Pub. Co., n.d. 36 pp. $.15.

LeRossignol, J. E. *First economics.* Chicago, A. W. Shaw Co., 1926. 183 pp. $2.00.

Meredith, F. L. *Hygiene, a textbook for college students.* Philadelphia, Blakiston's, 1926. 719 pp. $3.50.

Morton, T. S. *Legends of Gods and heroes; a first Latin reader.* New York, Macmillan, 1926. 180 pp. $.60.

Nickerson, P. S. ed. *Dawn: second national anthology of high school verse.* Middleboro, Mass., The Editor, 1925. 50 pp. $1.00.

Phillips, D. E., and Newlon, J. H. *The new social civics.* Chicago, Rand McNally, 1926. 536 pp. $1.50.

Rolt-Wheeler, Francis. *The boy with the U. S. marines.* Boston, Lothrop, Lee, 1926. 259 pp. $1.75.

Ross, E. A., and McCaull, M. E. *Readings in civic sociology.* Yonkers-on-Hudson, N. Y., World Bk. Co., 1926. 398 pp. $1.80.

Schapiro, J S. *Modern times in Europe.* Boston, Houghton Mifflin, 1926. 516 pp. $1.96.

Staley, S. C. *Calisthenics, modern methods of free-exercise instruction.* New York, A. S. Barnes, 1926. 338 pp. $3.00.

BOOKS FOR JUNIOR HIGH-SCHOOL STUDENTS

Bolenius, E. M. *Literature in the junior high school.* Boston, Houghton Mifflin, 1926. Book 1. 620 pp. $1.40.

Broome, E. C., and Adams, E. W. *Conduct and citizenship.* New York, Macmillan, 1926. 422 pp. $1.20.

BOOKS FOR ELEMENTARY STUDENTS

Boothe, Stella. *Jimmie and the junior safety council.* Yonkers-on-Hudson, N. Y., World Bk. Co., 1926. 246 pp. $1.20.

Dopp, K. E. *Bobby and Betty in the country.* Chicago, Rand McNally, 1926. 224 pp. $.95.

Field, W. T. *The Field sixth reader.* Boston, Ginn, 1926. 464 pp. $.92.

Headley, E. A. *How other people travel.* Chicago, Rand McNally, 1926. 216 pp. $.95.

Huber, M. B., and others. *The poetry book.* Chicago, Rand McNally, 1926. Book 1. 132 pp. Book 2. 146 pp. $.80 each.

Jordan, D. S., and Cather, K. D. *High lights of geography.* Yonkers-on-Hudson, N. Y., World Bk. Co., 1926. Europe. 321 pp. $1.44 North America. 358 pp. $1.44.

McMurry, F. M., and Benson, C. B. *Social arithmetic.* New York, Macmillan, 1926. Book 2. 338 pp. $.96.

Perdue, H. A., and LaVictoire, F. E. *Child life in many lands.* Chicago, Rand McNally, 1926. 160 pp. $.65.

MISCELLANY

Mawson, C. O. S. *Style-book for writers and editors.* New York, Thomas Y. Crowell, 1926. 213 pp. $1.50.

Winston simplified dictionary. Advanced ed. Philadelphia, Winston, 1926. 1,260 pp. Plain, $2.64. Indexed, $2.68.